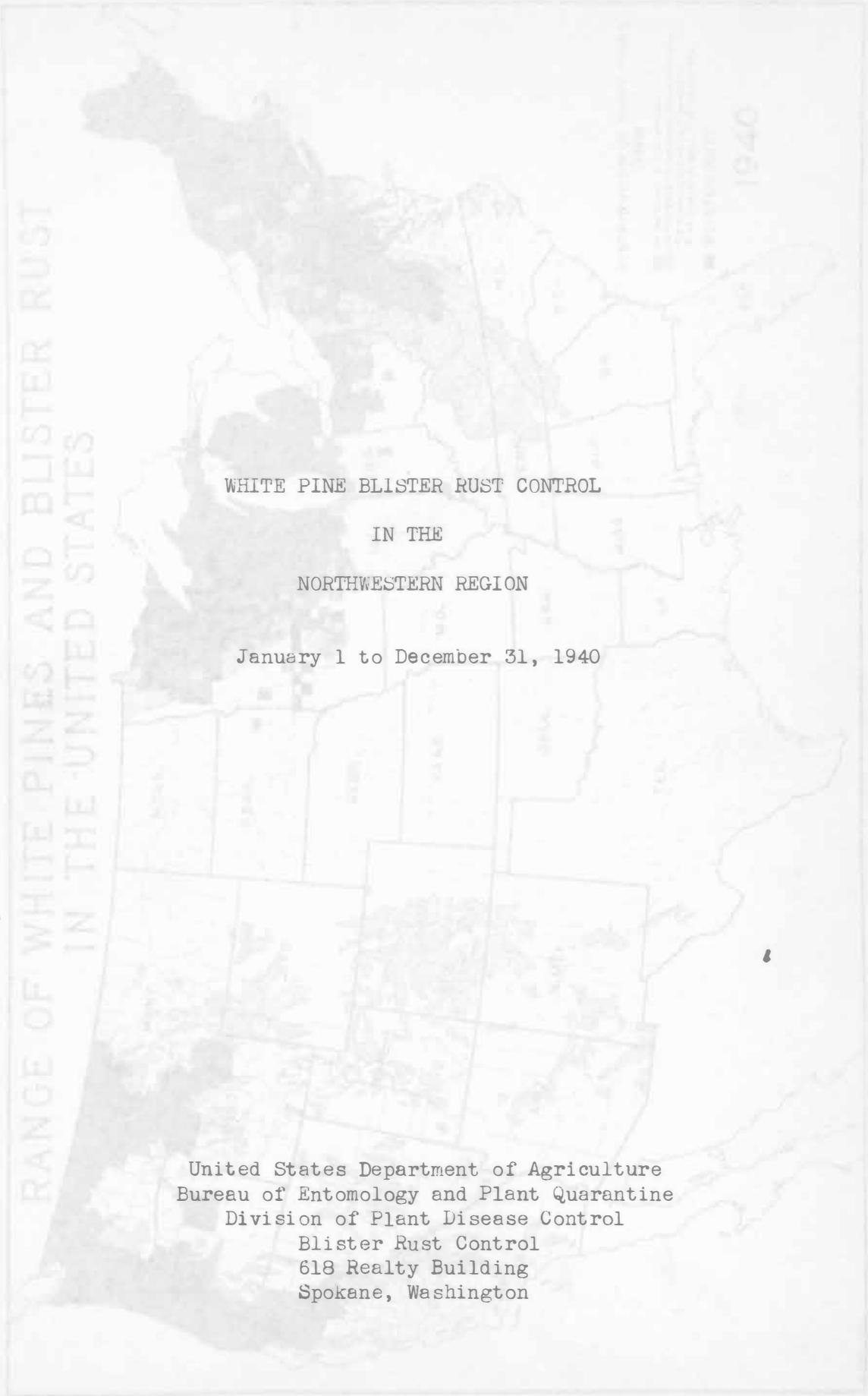


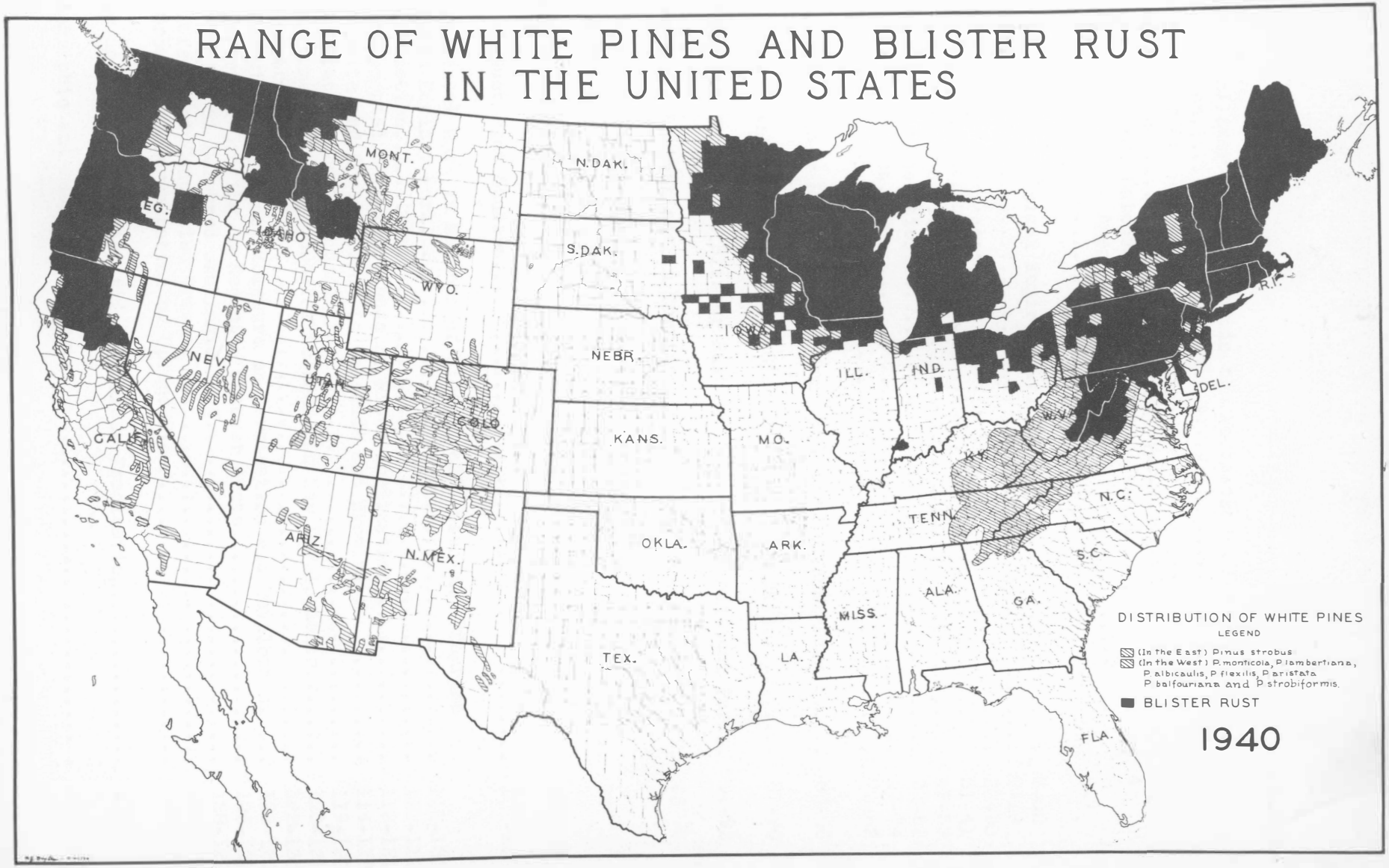
WHITE PINE BLISTER RUST CONTROL

IN THE

NORTHWESTERN REGION

January 1 to December 31, 1940

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine
Division of Plant Disease Control
Blister Rust Control
618 Realty Building
Spokane, Washington



U S DEPARTMENT OF AGRICULTURE

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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1940

Herman E. Swanson, Senior Pathologist

****

INTRODUCTION

The following report covers the blister rust control activities in the Northwestern Region for the calendar year 1940, as conducted by the Bureau of Entomology and Plant Quarantine, U. S. Forest Service, National Park Service, and the states of Idaho, Montana, Washington, Colorado and Wyoming. These activities were carried on in the five states in accordance with agreements executed between the Bureau of Entomology and Plant Quarantine and the other agencies in the respective states.

In reporting upon the progress of ribes eradication in the Northwestern Region, data are presented under the following headings:

1. Ribes eradication in the Inland Empire. This represents the commercial white pine area of northern Idaho, northwestern Montana, and northeastern Washington. In addition, there is a separate report for each national forest area and adjacent state and private lands. These individual reports include:

    a. Cabinet and Kootenai operations (Montana).
    b. Clearwater operation (Idaho).
    c. St. Joe operation (Idaho).
    d. Coeur d'Alene operation (Idaho).
    e. Kaniksu operation (Idaho and Washington).
    f. Mount Spokane operation (Idaho and Washington).

2. National Parks

    a. Mount Rainier
    b. Glacier

3. Central Rocky Mountain Region.

    a. Colorado
    b. Wyoming

The 1938 annual report contains the latest summary of ribes eradication work performed in this region, since 1938 was the last year that this work was performed in this territory.

ORGANIZATION AND ADMINISTRATION

The Bureau of Entomology and Plant Quarantine conducted experimental work in methods of ribes eradication, ribes ecology studies, pine disease surveys, and pine damage studies.

The ribes eradication program consisted of the following projects:

	Camps	Workers
Bureau of Entomology and Plant Quarantine:		
ERA (financed by WPA allotments)	13	887
State of Idaho in cooperation with the Bureau of Entomology and Plant Quarantine:		
Regular (financed by state and federal funds)	2	66
CCC (S-camps in Idaho)	2	141
U. S. Forest Service:		
Regular (financed by regular appropriations)	32	1,138
ERA (financed by WPA allotments)	7	379
CCC (F-camps)	15	1,127
National Park Service:		
CCC (Mount Rainier)	3	95
CCC (Glacier)	3	90

Summary:

	Camps	Workers
Regular	34	1,204
ERA	20	1,266
CCC	23	1,453
Total	77	3,923

APPROPRIATIONS - BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Northwestern Region - Blister Rust Control

Regular Appropriations:	
Fiscal year 1940	$59,233.38
Fiscal year 1941 (as of 12/31/40)	72,700.00
WPA Allotments:	
Fiscal year 1940:	
Idaho	$305,000.00
Washington	34,000.00
Administrative	7,304.00
Fiscal year 1941 (as of 12/31/40)	
Idaho	$185,910.00
Washington	25,500.00
Administrative	5,100.00
Cooperative Funds:	
State of Idaho	$10,035.35 *

*Biennial appropriation by State Legislature for period April 1, 1939 to March 31, 1941 was $28,000.00

EXPENDITURES FOR CALENDAR YEAR 1940

Bureau of Entomology and Plant Quarantine:

	Fiscal Year 1940	Fiscal Year 1941	Total
Regular Funds:			
Idaho	$29,965.52	$23,812.82	$53,778.34
Montana	3,135.10	3,104.29	6,239.39
Washington	3,323.40	5,561.60	8,885.00
Wyoming	-	676.77	676.77
Total	$36,424.02	$33,155.48	$69,579.50
ERA (Project Funds):			
Idaho	$ 98,366.33	$130,732.49	$229,098.82
Washington	15,786.07	15,866.56	31,652.63
Total	$114,152.40	$146,599.05	$260,751.45
ERA (Administrative Funds):			
Idaho	$3,519.00	$1,365.00	$4,884.00
Washington	488.53	189.32	677.85
Total	$4,007.53	$1,554.32	$5,561.85
Cooperative Funds:			
State of Idaho (calendar year 1940)			$10,034.48

Bureau of Entomology and Plant Quarantine (Summary):

State	Regular	ERA	Cooperative	Total
Idaho	$53,778.34	$233,982.82	$10,034.48	$297,795.64
Montana	6,239.39	-	-	6,239.39
Washington	8,885.00	32,330.48	-	41,215.48
Wyoming	676.77	-	-	676.77
Total	$69,579.50	$266,313.30	$10,034.48	$345,927.28

U. S. Forest Service:

State	Regular	ERA	Total
Idaho	$336,918.22	$48,914.39	$385,832.61
Montana	47,727.74	28,807.77	76,535.51
Washington	52,391.43	-	52,391.43
Total	$437,037.39	$77,722.16	$514,759.55

Note: Expenditures from CCC funds not included in this report.

EXPENDITURES BY ALL AGENCIES FOR ALL YEARS

Bureau of Entomology and Plant Quarantine (1922-1940):

Federal Funds:

State	Regular	ERA	NIRA	Total
Idaho	$1,165,160.60	$2,900,763.68	$470,841.62	$4,536,765.90
Montana	191,953.09	196,847.11	88,306.79	477,106.99
Washington	211,869.75	437,039.29	105,199.60	754,108.64
Sub-Total	$1,568,983.44	$3,534,650.08	$664,348.01	$5,767,981.53
Colorado	11,852.04	59,396.51	8,041.45	79,290.00
Wyoming	10,480.59	58,283.96	7,107.41	75,871.96
Sub-Total	$ 22,332.63	$ 117,680.47	$ 15,148.86	$ 155,161.96
Grand Total	$1,591,316.07	$3,652,330.55	$679,496.87	$5,923,143.49

Cooperative Funds (1928-1940):

Idaho	State	$132,148.50
	Private	88,383.63
	Total	$220,532.13

Forest Service (1930-1940):

Forest	State	Regular	ERA	NIRA	Total
Clearwater	Idaho	$ 543,602.59	$ 78,808.87	$ 334,645.93	$ 957,057.39
St. Joe	Idaho	1,014,526.61	6,983.40	376,356.66	1,397,866.67
Coeur d'Alene	Idaho	413,932.36	197,410.60	472,399.21	1,083,742.17
Kaniksu	Idaho	162,591.48	137,952.32	185,782.36	486,326.16
Kaniksu	Washington	99,426.54	-	134,320.68	233,747.22
Cabinet	Montana	102,058.22	103,197.46	149,858.06	355,113.74
Kootenai	Montana	39,076.14	28,233.00	-	67,309.14
Sub-Total	Idaho	2,134,653.04	421,155.19	1,369,184.16	3,924,992.39
Sub-Total	Montana	141,134.36	131,430,46	149,858.06	422,422.88
Sub-Total	Washington	99,426.54	-	134,320.68	233,747.22
Grand Total		$2,375,213.94	$552,585.65	$1,653,362.90	$4,581,162.49

National Park Service (1930-1939):

Park	State	Regular
Mount Rainier	Washington	$22,345.37

PERSONNEL

The following are the permanent personnel of the Bureau of Entomology and Plant Quarantine who were employed in the Northwestern Region during the calendar year 1940:

1. In charge of the Northwestern Region, H. E. Swanson, Senior Pathologist. Assistant Regional Leader, E. L. Joy, Forester.

2. Cooperative Local Control:

   a. Montana Operation:
      Technical Supervisor, A. S. Skoglund, Assistant Pathologist.

   b. Clearwater Operation, Idaho:
      Technical Supervisor, F. J. Heinrich, Associate Pathologist.
      Checking Supervisor, H. J. Faulkner, Chief Scientific Aid.

   c. St. Joe Operation, Idaho:
      Technical Supervisor, H. J. Hartman, Associate Forester.
      Assistant, J. C. Gynn, Agent.
      Checking Supervisor, W. F. Painter, Assistant Pathologist.

   d. Coeur d'Alene Operation, Idaho:
      Technical Supervisor, A. L. Pence, Jr., Assistant Pathologist.

   e. Kaniksu Operation, Idaho and Washington:
      Technical Supervisor, F. O. Walters, Associate Pathologist.
      Checking Supervisor, H. A. Brischle, Assistant Pathologist.

   f. Mount Rainier and Glacier National Parks and Mount Spokane Operation, Idaho, Montana, Washington:
      Technical Supervisor, M. C. Riley, Associate Forester.

3. Projects:

   a. Pine Disease Surveys and Effectiveness of Control Studies:
      In charge, R. L. MacLeod, Associate Pathologist.
      Assistant, C. R. Stillinger, Assistant Pathologist.

   b. Development of Ribes Eradication Methods:
      Ecological and Chemical, V. D. Moss*, Assistant Pathologist.
      Mechanical, J. F. Breakey*, Assistant Pathologist.
      C. M. Chapman, Chief Scientific Aid.

   c. Informational Work:
      In charge, E. L. Joy, Forester.
      Assistant, H. M. Cowling, Chief Scientific Aid.

*Personnel assigned to Northwestern Region by H. R. Offord, Pathologist in charge of methods development in the West.

4. Business Administration and Clerical Work:

a. E. G. Schmidt, Junior Administrative Assistant.
E. K. LaPrey, Field Assistant.

b. M. L. McWold, Senior Clerk.
E. L. Talso, Assistant Clerk-Stenographer.
M. Wiggs, Assistant Clerk-Stenographer. (Trans.Pear Psylla Control)

c. L. E. Klatt, Senior Clerk.
C. E. Davis, Assistant Clerk-Stenographer.
R. R. Rieth, Junior Clerk-Stenographer.
L. C. Eddy, Junior Typist (Trans. Pear Psylla Control).
D. E. Short, Junior Clerk-Stenographer.
M. M. McLean, Junior Clerk-Stenographer

d. H. D. Langley, Junior Administrative Assistant in charge of personnel.

The following are the personnel of the Forest Service in charge of blister rust control work on National Forest lands:

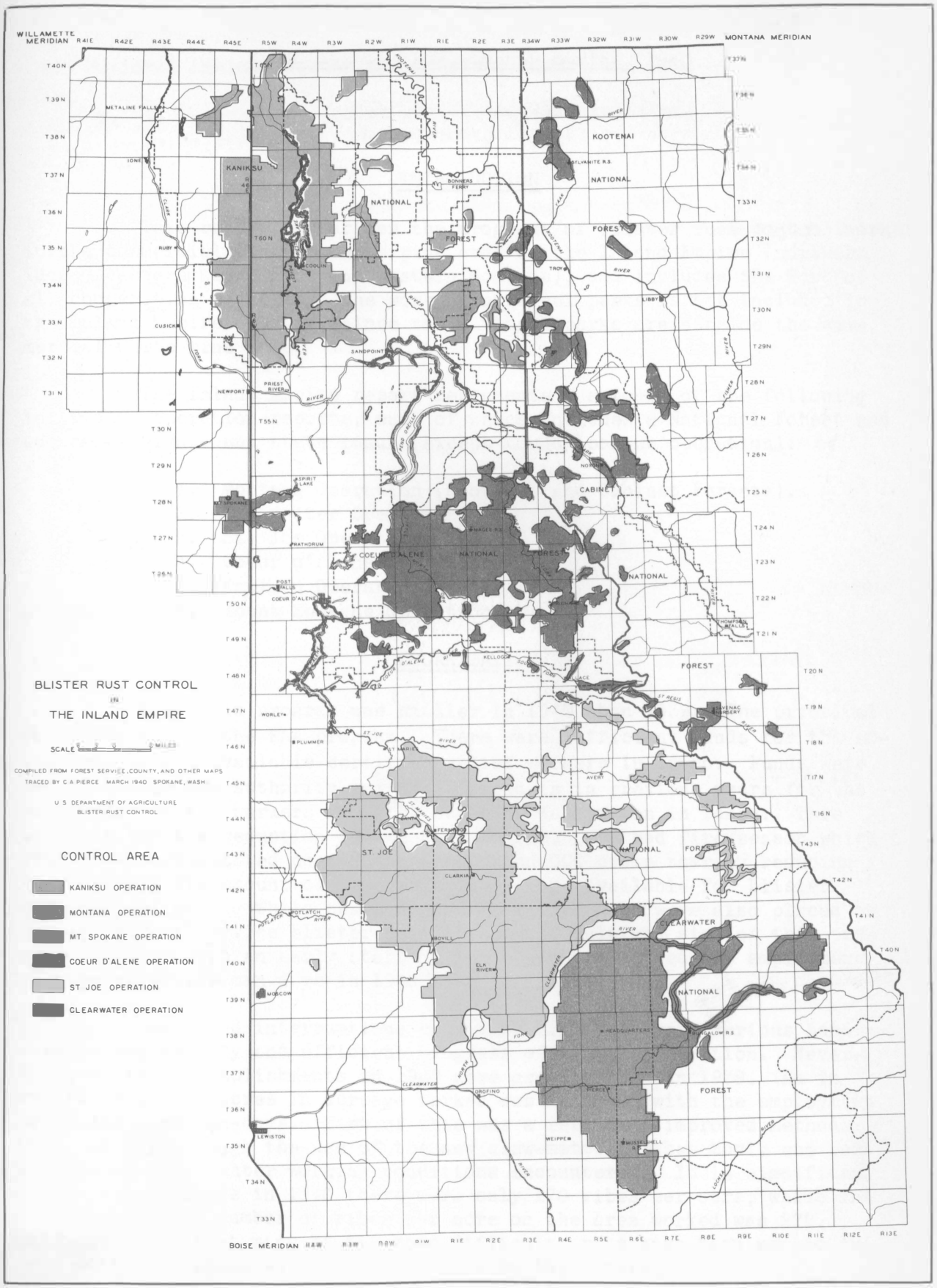
1. Cabinet and Kootenai National Forests, Montana - C. H. Johnson, Associate Pathologist.

2. Clearwater National Forest, Idaho - D. Kyle, Chief Scientific Aid.

3. St. Joe National Forest, Idaho - D. J. Moore, Assistant Pathologist and M. D. Oaks, Principal Agricultural Aid.

4. Coeur d'Alene National Forest, Idaho - N. D. Nelson, Associate Pathologist.

5. Kaniksu National Forest, Idaho and Washington - F. O. Walters, Associate Pathologist (Bureau of Entomology and Plant Quarantine and U. S. Forest Service), Kermit Miller, Assistant Pathologist


WILLAMETTE MERIDIAN
MONTANA MERIDIAN
BOISE MERIDIAN
KANIKSU NATIONAL FOREST
KOOTENAI NATIONAL FOREST
CABINET NATIONAL FOREST
COEUR D'ALENE NATIONAL FOREST
ST JOE NATIONAL FOREST
CLEARWATER NATIONAL FOREST
BLISTER RUST CONTROL IN THE INLAND EMPIRE
SCALE
COMPILED FROM FOREST SERVICE, COUNTY, AND OTHER MAPS
TRACED BY C A PIERCE MARCH 1940 SPOKANE, WASH.
U S DEPARTMENT OF AGRICULTURE
BLISTER RUST CONTROL
CONTROL AREA
KANIKSU OPERATION
MONTANA OPERATION
MT SPOKANE OPERATION
COEUR D'ALENE OPERATION
ST JOE OPERATION
CLEARWATER OPERATION

RIBES ERADICATION, INLAND EMPIRE, 1940

By
Herman E. Swanson
Senior Pathologist

INTRODUCTION

This report summarizes the progress of blister rust control work in the commercial western white pine area of the Inland Empire (northern Idaho, eastern Washington and western Montana), and includes the work of all cooperating agencies. The work on national parks is not included in the Inland Empire summary, since the national parks are outside the commercial white pine area.

The Inland Empire report represents a summary of the following individual operation reports, each of which includes a National Forest and adjacent private and state lands (except Mount Spokane operation):

1. Montana Operation (Kootenai and Cabinet Forests).
2. Clearwater Operation.
3. St. Joe Operation.
4. Coeur d'Alene Operation.
5. Kaniksu Operation.
6. Mount Spokane Operation.

ORGANIZATION

The field program was smaller in 1940 than 1939. The principal reduction was in the ERA program. There were sufficient funds for the employment of all available certified relief workers in Idaho. Funds were not available and authority was not granted as in previous years for the employment of WPA workers from the state of Washington in Idaho. This accounts for the reduction in the ERA program. The bad fire season which prevailed necessitated continuous demands on CCC crews thereby reducing considerably the amount of time which they were available for blister rust control work. While heavy demands for fire duty were also placed on regular Forest Service blister rust crews, the enlarged size of this program together with an early start in the season permitted the employment of more effective man-days in 1940 than in 1939.

Continued interruptions caused by fire duty were serious handicaps to the orderly and efficient progress of ribes eradication. Nevertheless, the accomplishments in 1940 were greater than in 1939. An increase of 12,226 acres in acreage worked was achieved with the employment of 15,146 less man-days. Part of this was a result of improved methods, particularly through the use of the new claw-mattock ribes tool, and part was due to the lighter working conditions encountered. It is significant that on the average in 1940 there were only 170 ribes per acre, while in 1939 the average number of ribes per acre on the area worked was 272. This indicates that many of the more difficult areas have been worked and less difficult areas will be encountered in the future.

FIELD PROGRAM

The following tabulation shows the size of the blister rust control program in the field in the Inland Empire during the 1939 and the 1940 seasons:

Program*	Number Camps		Number Men	
	1939	1940	1939	1940
EQ-ERA	18	13	1,155	887
FS-ERA	5	7	285	379
FS-Regular	29	32	1,060	1,138
F-CCC	23	15	1,420	1,127
S-CCC	3	2	125	141
State-Coop.	2	2	75	66
Total	80	71	4,120	3,738

*Designations used in this report:

EQ - Bureau of Entomology and Plant Quarantine.
FS - Forest Service.
Reg. - Program on regular departmental appropriations.
F-CCC - Forest Service - Civilian Conservation Corps.
S-CCC - State - Civilian Conservation Corps.
ERA - Emergency Relief Program (WPA).
NIRA - Public Works Program (PWA).
State-Coop.- Program financed cooperatively by Bureau and State of Idaho.

METHODS

Brief mention should be made of three significant points in relation to field methods in respect to the 1940 field season.

1. The new claw-mattock ribes tool developed first in the 1938 season, its design improved in 1939 and used extensively during that year, was used throughout the entire field program during 1940. This tool not only facilitates the removal of ribes by reducing the time and effort required, but also takes out the complete vital root system. This latter point is particularly important since the breaking off of ribes at the root crown is practically eliminated. Improperly eradicated bushes have been one of the most serious factors in the rework problem.

2. For the first time since 1932 there was no operation employing the bulldozer method for ribes eradication. It appears quite definite that very little, if any, future bulldozer work for ribes eradication will be required.

3. During the last several years ribes eradication work has been confined to young stands of white pine which are most threatened by blister rust. Mature stands, in which blister rust will cause no damage before the timber is cut, have been carefully avoided. These mature areas have been retained in the "unworked" classification when in reality no control work is necessary for the protection of the present stand of timber. To clarify this situation, these areas are being segregated and classified accordingly. Adequate information is available to permit the segregation of 170,110 acres in this class.

EXPENDITURES FOR RIBES ERADICATION

The following tabulations include only those expenditures made in connection with the ribes eradication program. The statement of expenditures includes those federal funds expended from appropriations directly allotted to the Bureau of Entomology and Plant Quarantine and to the U. S. Forest Service, and state funds turned over to the Bureau by the State of Idaho.

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
INLAND EMPIRE

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$437,037.39
	ERA	77,722.16
	Total	514,759.55
Bureau of Entomology and Plant Quarantine	Regular	28,940.89
	ERA	234,604.00
	Total	263,544.89
State of Idaho	Idaho	10,034.48
Grand Total		$788,339.92

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
INLAND EMPIRE

Item	Forest Service			Bureau of Entomology and Plant Quarantine			State of Idaho	Total
	Regular	ERA	Total	Regular	ERA	Total		
Sal. perm. men	$ 12,468.88		$ 12,468.88	$26,966.66	$ 225.00	$ 27,191.66		$ 39,660.54
Sal. temp. men	69,435.46	$ 5,568.92	75,054.38		25,143.54	25,143.54		100,197.92
Wages, temp. labs.	266,189.74	54,058.29	320,248.03	1,629.20	159,494.63	161,123.83	$10,034.48	491,406.34
Subs. supplies	58,057.17	13,220.37	71,277.54	162.09	33,906.31	34,068.40		105,345.94
Equipment	15,042.33	543.05	15,585.38		2,540.82	2,540.82		18,126.20
Trucks	2,344.40	936.08	3,280.48					3,280.48
Travel and transp.	8,200.84	1,498.88	9,699.72	182.94	5,936.98	6,119.92		15,819.64
Chemicals	392.89	113.06	505.95					505.95
Twine	2,020.68	662.40	2,683.08					2,683.08
Other supplies	2,835.00	1,121.11	3,956.11		7,356.72	7,356.72		11,312.83
Total	$437,037.39	$77,722.16	$514,759.55	$28,940.89	$234,604.00	$263,544.39	$10,034.48	$788,338.92

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES BY PROGRAMS
INLAND EMPIRE

Program	Number Effective Man Days	Expenditures According to Funds		Effective Man Day Cost
EQ-ERA	39,465	EQ-ERA	$229,014.00	$6.21
		EQ-Reg.	15,847.95	
		Total	244,861.95	
FS-ERA	12,082	FS-Reg.	13,066.66	7.57
		FS-ERA	77,029.16	
		EQ-ERA	192.76	
		EQ-Reg.	1,241.00	
		Total	91,529.58	
FS-Reg.	56,182	FS-Reg.	404,692.40	7.34
		FS-ERA	347.00	
		EQ-ERA	540.00	
		EQ-Reg.	6,971.94	
		Total	412,551.34	
State-Coop.	2,111	State	10,034.48	6.01
		EQ-Reg.	900.00	
		EQ-ERA	1,757.24	
		Total	12,691.72	
CCC	27,312	FS-Reg.	15,386.69	CCC Funds not Included
		FS-ERA	346.00	
		EQ-Reg.	3,980.00	
		Total	20,212.69	
EQ-ERA Winter Project		EQ-ERA	3,100.00	
Pine Disease Survey		FS-Reg.	2,204.85	
White Pine Survey		FS-Reg.	1,186.79	
Total Cost 1940 Program			$788,333.92	

	Forest Service	Bureau
Number of meals served	387,300	201,469
Average cost per meal	$0.191	$0.167
Pounds twine used	17,157	8,487
Pounds chemical used	16,310	3,847

SUMMARY OF RIBES ERADICATION, 1940
INLAND EMPIRE

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Total Gallons Spray
Open Reproduction	14,179	37,989	4,940	57,108	82,819	10,419,489	
Dense Reproduction	202	881	54	1,137	1,348	58,620	
Open Pole	12,421	13,488	1,493	27,402	17,385	1,755,682	
Dense Pole	2,153	1,900	86	4,139	1,710	162,019	
Open Mature	2,299	3,434	434	6,167	6,433	774,583	
Dense Mature	1,072			1,072	1	19	
Cutover	809	6,289	4,820	11,918	17,046	4,126,028	
Brush	264	99	95	458	568	70,646	
Burn		243		243	582	470,829	
All Upland	33,399	64,323	11,922	109,644	127,892	17,827,915	
Stream (Hand)	1,586	2,605	1,480	5,671	12,020	1,662,163	
Stream (Chemical)	222	131	156	509	951	44,040	14,680
Stream (Zone)	90	203		293	302	77,141	
All Stream	1,676	2,808	1,480	5,964	13,273	1,783,344	
All Types	35,075	67,131	13,402	115,608	141,165	19,621,259	

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Ribes	Gallons Spray
Open Reproduction	14,179	24,004	5,595,682		1.69	395	
Dense Reproduction	202	349	16,513		1.73	82	
Open Pole	12,421	6,961	963,454		.56	78	
Dense Pole	2,153	772	61,841		.36	29	
Open Mature	2,299	1,720	342,769		.75	149	
Dense Mature	1,072	1	19				
Cutover	809	1,307	256,607		1.62	317	
Brush	264	485	67,467		1.84	256	
All Upland	33,399	35,599	7,304,452		1.07	219	
Stream (Hand)	1,586	5,531	925,770		3.49	584	
Stream (Chemical)	222	430	15,408	5,136	1.94	69	23
Stream (Zone)	90	123	40,256		1.37	447	
All Stream	1,676	6,084	981,434		3.63	586	
All Types	35,075	41,683	8,285,886		1.19	236	

TABLE NO. 3B - SECOND WORKING

Open Reproduction	37,989	53,623	4,475,931		1.41	118	
Dense Reproduction	881	904	40,355		1.03	46	
Open Pole	13,488	9,449	704,414		.70	52	
Dense Pole	1,900	905	99,289		.48	52	
Open Mature	3,434	4,413	419,289		1.29	122	
Cutover	6,289	9,469	3,150,183		1.51	501	
Brush	99	36	1,822		.36	18	
Burn	243	582	470,829		2.40	1,938	
All Upland	64,323	79,381	9,362,112		1.23	146	
Stream (Hand)	2,605	4,689	589,467		1.80	226	
Stream (Chemical)	131	343	18,489	6,163	2.62	141	47
Stream (Zone)	203	179	36,885		.88	182	
All Stream	2,808	5,211	644,841		1.86	230	
All Types	67,131	84,592	10,006,953		1.26	149	

TABLE NO. 3C - THIRD WORKING

Open Reproduction	4,940	5,192	347,876		1.05	70	
Dense Reproduction	54	95	1,652		1.76	31	
Open Pole	1,493	975	87,814		.65	59	
Dense Pole	86	33	889		.38	10	
Open Mature	434	300	12,525		.69	29	
Cutover	4,820	6,270	719,238		1.30	149	
Brush	95	47	1,357		.50	14	
All Upland	11,922	12,912	1,171,351		1.08	98	
Stream (Hand)	1,480	1,800	146,926		1.22	99	
Stream (Chemical)	156	178	10,143	3,381	1.14	65	22
All Stream	1,480	1,978	157,069		1.34	106	
All Types	13,402	14,890	1,328,420		1.11	99	

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
INLAND EMPIRE

State	Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes
Idaho	First	EQ-ERA	6,394	11,931	1,658,178		1.87	259
		FS-ERA	2,022	1,841	253,510		.91	125
		FS-Reg.	4,125	8,220	2,038,752		1.99	494
		Cooperative	4,842	1,874	474,073		.39	98
		F-CCC	1,755	4,010	446,446	4,410	2.28	254
		Total	19,138	27,876	4,870,959	4,410	1.46	255
	Second	EQ-ERA	17,023	19,774	3,912,613	950	1.16	230
		FS-ERA	4,289	4,985	380,864		1.16	89
		FS-Reg.	29,741	33,462	3,588,145	1,995	1.13	121
		Cooperative	373	237	35,482		.64	95
		F-CCC	8,200	18,770	916,645		2.29	112
		S-CCC	1,091	1,667	136,505		1.53	125
		Total	60,717	78,895	8,970,254	2,945	1.30	148
	Third	EQ-ERA	4,780	5,027	582,084	2,110	1.05	122
		FS-ERA	487	250	24,398		.51	50
		FS-Reg.	3,389	3,366	250,546	1,271	.99	74
		F-CCC	2,002	3,792	128,251		1.89	64
		S-CCC	480	755	149,373		1.57	311
		Total	11,138	13,190	1,134,652	3,381	1.18	102
	All Workings	EQ-ERA	28,197	36,732	6,152,875	3,060	1.30	218
		FS-ERA	6,798	7,076	658,772		1.04	97
		FS-Reg.	37,255	45,048	5,877,443	3,266	1.21	158
		Cooperative	5,215	2,111	509,555		.40	98
		F-CCC	11,957	26,572	1,491,342	4,410	2.22	125
		S-CCC	1,571	2,422	285,878		1.54	182
		Total	90,993	119,961	14,975,865	10,736	1.32	165
Washington	First	FS-Reg.	6,359	5,357	2,555,239		.84	402
		F-CCC	109	346	38,022		3.17	349
		Total	6,468	5,703	2,593,261		.88	401
	Second	EQ-ERA	1,221	1,241	184,034		1.02	151
		FS-Reg.	2,811	1,553	638,172		.55	227
		F-CCC	690	930	75,443		1.35	109
		Total	4,722	3,724	897,649		.79	190
	Third	EQ-ERA	1,801	1,492	173,632		.83	96
	All Workings	EQ-ERA	3,022	2,733	357,666		.90	118
		FS-Reg.	9,170	6,910	3,193,411		.75	348
		F-CCC	799	1,276	113,465		1.60	142
		Total	12,991	10,919	3,664,542		.84	282
Montana	First	FS-ERA	4,479	4,392	428,764	726	.98	96
		FS-Reg.	3,121	3,366	352,890		1.08	113
		F-CCC	1,869	356	40,012		.19	21
		Total	9,469	8,104	821,666	726	.86	87
	Second	FS-ERA	371	556	47,584		1.50	128
		FS-Reg.	1,082	718	61,616	3,218	.66	57
		F-CCC	239	699	29,850		2.92	125
		Total	1,692	1,973	139,050	3,218	1.17	82
	Third	FS-ERA	150	68	6,069		.45	40
		FS-Reg.	313	140	14,067		.45	45
		Total	463	208	20,136		.45	43
	All Workings	FS-ERA	5,000	5,006	482,417	726	1.00	96
		FS-Reg.	4,516	4,224	428,573	3,218	.94	95
		F-CCC	2,108	1,055	69,862		.50	33
		Total	11,624	10,285	980,852	3,944	.88	84
Total	First	EQ-ERA	6,394	11,931	1,658,178		1.87	259
		FS-ERA	6,501	6,223	682,274	726	.96	105
		FS-Reg.	13,605	16,943	4,946,881		1.25	364
		Cooperative	4,842	1,874	474,073		.39	98
		F-CCC	3,733	4,712	524,480	4,410	1.26	140
		Total	35,075	41,683	8,285,886	5,136	1.19	236
	Second	EQ-ERA	18,244	21,015	4,096,647	950	1.15	225
		FS-ERA	4,660	5,541	428,448		1.19	92
		FS-Reg.	33,634	35,733	4,287,933	5,213	1.06	127
		Cooperative	373	237	35,482		.64	95
		F-CCC	9,129	20,399	1,021,938		2.23	112
		S-CCC	1,091	1,667	136,505		1.53	125
		Total	67,131	84,592	10,006,953	6,163	1.26	149
	Third	EQ-ERA	6,581	6,519	755,716	2,110	.99	115
		FS-ERA	637	318	30,467		.50	48
		FS-Reg.	3,702	3,506	264,613	1,271	.95	71
		F-CCC	2,002	3,792	128,251		1.89	64
		S-CCC	480	755	149,373		1.57	311
		Total	13,402	14,890	1,328,420	3,381	1.11	99
	All Workings	EQ-ERA	31,219	39,465	6,510,541	3,060	1.26	209
		FS-ERA	11,798	12,082	1,141,189	726	1.02	97
		FS-Reg.	50,941	56,182	9,499,427	6,484	1.10	186
		Cooperative	5,215	2,111	509,555		.40	98
		F-CCC	14,864	28,903	1,674,669	4,410	1.94	113
		S-CCC	1,571	2,422	285,878		1.54	182
		Total	115,608	141,165	19,621,259	14,680	1.22	170

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
INLAND EMPIRE

State	Working	Number of Acres Worked															
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total					
		Federal					Federal					Federal					
		Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Total
Idaho	First	6,769		6,769	77	1,056	3,013	170	3,183	5,483	2,570	9,782	170	9,952	5,560	3,626	19,138
	Second	30,470	360	30,830	2,525	8,875	4,886	123	5,009	4,281	9,197	35,356	483	35,839	6,806	18,072	60,717
	Third	4,757		4,757	41	1,080	591	46	637	523	4,100	5,348	46	5,394	564	5,180	11,138
	Total	41,996	360	42,356	2,643	11,011	8,490	339	8,829	10,287	15,867	50,486	699	51,185	12,930	26,878	90,993
Washington	First	4,738		4,738	50	1,680						4,738		4,738	50	1,680	6,468
	Second	2,036		2,036		1,465	90		90	992	139	2,126		2,126	992	1,604	4,722
	Third									920	881				920	881	1,801
	Total	6,774		6,774	50	3,145	90		90	1,912	1,020	6,864		6,864	1,962	4,165	12,991
Montana	First	7,873		7,873		1,596						7,873		7,873		1,596	9,469
	Second	1,244		1,244		448						1,244		1,244		448	1,692
	Third	439		439		24						439		439		24	463
	Total	9,556		9,556		2,068						9,556		9,556		2,068	11,624
Total	First	19,380		19,380	127	4,332	3,013	170	3,183	5,483	2,570	22,393	170	22,563	5,610	6,902	35,075
	Second	33,750	360	34,110	2,525	10,788	4,976	123	5,099	5,273	9,336	38,726	483	39,209	7,798	20,124	67,131
	Third	5,196		5,196	41	1,104	591	46	637	1,443	4,981	5,787	46	5,833	1,484	6,085	13,402
	Total	58,326	360	58,686	2,693	16,224	8,580	339	8,919	12,199	16,887	66,906	699	67,605	14,892	33,111	115,608

TABLE NO. 6

TOTAL RIBES BY SPECIES ERADICATED, 1940
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Open Reproduction	14,179	1,772,943	3,821,540	20		3	1,176		5,595,682
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	12,421	476,529	476,765		8,384	1,776			963,454
	Dense Pole	2,153	52,871	8,970						61,841
	Open Mature	2,299	285,282	26,204	240		31,043			342,769
	Dense Mature	1,072	3					16		19
	Cutover	809	205,125	49,698		1,784				256,607
	Brush	264	8,592	58,875						67,467
	All Upland	33,399	2,804,832	4,455,114	260	10,168	32,822	1,256		7,304,452
	Stream	1,676	793,617	39,766	23,143	124,622		286		981,434
	All Types	35,075	3,598,449	4,494,880	23,403	134,790	32,822	1,542		8,285,886
Second	Open Reproduction	37,989	1,224,825	3,195,791	12,194	35,206	5,324		2,591	4,475,931
	Dense Reproduction	881	18,902	21,453						40,355
	Open Pole	13,488	322,154	368,745	931	12,584				704,414
	Dense Pole	1,900	67,055	32,234						99,289
	Open Mature	3,434	180,933	220,645	275		17,436			419,289
	Cutover	6,289	477,817	2,651,791	19,732	758	85			3,150,183
	Brush	99	456	1,366						1,822
	Burn	243	89,566	381,263						470,829
	All Upland	64,323	2,381,708	6,873,288	33,132	48,548	22,845		2,591	9,362,112
	Stream	2,808	501,164	31,029	30,781	75,282	21		6,564	644,841
	All Types	67,131	2,882,872	6,904,317	63,913	123,830	22,866		9,155	10,006,953
Third	Open Reproduction	4,940	168,579	171,706	5,785	1,806				347,876
	Dense Reproduction	54	1,182	470						1,652
	Open Pole	1,493	42,928	44,869	17					87,814
	Dense Pole	86	657	232						889
	Open Mature	434	8,715	3,810						12,525
	Cutover	4,820	127,197	579,767	12,131		143			719,238
	Brush	95	379	978						1,357
	All Upland	11,922	349,637	801,832	17,933	1,806	143			1,171,351
	Stream	1,480	97,919	1,660	21,108	36,382				157,069
	All Types	13,402	447,556	803,492	39,041	38,188	143			1,328,420
All Workings	Open Reproduction	57,108	3,166,347	7,189,037	17,999	37,012	5,327	1,176	2,591	10,419,489
	Dense Reproduction	1,137	23,571	34,985				64		58,620
	Open Pole	27,402	841,611	890,379	948	20,968	1,776			1,755,682
	Dense Pole	4,139	120,583	41,436						162,019
	Open Mature	6,167	474,930	250,659	515		48,479			774,583
	Dense Mature	1,072	3					16		19
	Cutover	11,918	810,139	3,281,256	31,863	2,542	228			4,126,028
	Brush	458	9,427	61,219						70,646
	Burn	243	89,566	381,263						470,829
	All Upland	109,644	5,536,177	12,130,234	51,325	60,522	55,810	1,256	2,591	17,837,915
	Stream	5,964	1,392,700	72,455	75,032	236,286	21	286	6,564	1,783,344
	All Types	115,608	6,928,877	12,202,689	126,357	296,808	55,831	1,542	9,155	19,621,259

SUMMARY OF RIBES ERADICATION, 1923-1940
INLAND EMPIRE

TABLE NO. 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Open Reproduction	475,300	112,704	10,051	598,055	745,261	186,942,700	
Dense Reproduction	93,476	7,885	123	101,484	46,840	6,638,119	
Open Pole	280,078	52,758	2,867	335,703	165,539	28,680,495	
Dense Pole	71,136	7,334	201	78,671	18,254	2,728,202	
Open Mature	652,670	40,487	2,039	695,196	327,215	69,576,712	
Dense Mature	69,024	1,952		70,976	8,786	1,187,649	
Cutover	48,513	39,829	8,926	97,268	105,943	31,146,890	
Brush	24,323	2,214	287	26,824	26,715	5,084,841	
Burn	10,135	589		10,724	8,034	3,940,992	
Subalpine	3,255	231	88	3,574	2,351	479,573	
Meadow-Field	2,569	10		2,579	152	12,203	
All Upland	1,730,479	265,993	24,582	2,021,054	1,455,090	336,418,376	
Stream (Hand)	118,105	45,362	11,025	174,492	288,717	68,415,860	
Stream (Chemical)	22,518	8,692	991	32,201	66,888	5,315,492	1,740,959
Stream (Slash)	1,578	53	40	1,671	19,489	1,008,814	
Stream (Machine)	2,150	102		2,252	12,799	1,222,576	
Stream (Zone)	208	4,143		4,351	3,268	507,427	
All Stream	121,996	49,660	11,025	182,681	391,161	76,470,169	
All Types	1,852,475	315,653	35,607	2,203,735	1,846,251	412,888,545	

TABLE NO. 7A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Ribes	Gallons Spray
Open Reproduction	475,300	590,166	169,884,216		1.24	355	
Dense Reproduction	93,476	40,907	6,075,661		.44	65	
Open Pole	280,078	132,632	24,985,735		.47	89	
Dense Pole	71,136	15,266	2,404,191		.21	34	
Open Mature	652,670	299,423	66,075,180		.46	101	
Dense Mature	69,024	8,108	1,114,253		.12	16	
Cutover	48,513	47,042	16,354,780		.97	337	
Brush	24,323	24,416	4,847,088		1.00	199	
Burn	10,135	7,171	3,414,938		.71	337	
Subalpine	3,255	2,170	463,787		.67	142	
Meadow-Field	2,569	151	12,131		.06	5	
All Upland	1,730,479	1,167,452	294,631,960		.67	170	
Stream (Hand)	118,105	216,285	56,451,089		1.83	478	
Stream (Chemical)	22,518	53,617	4,573,428	1,493,541	2.38	203	66
Stream (Slash)	1,578	18,051	971,517		11.44	616	
Stream (Machine)	2,150	12,341	1,176,076		5.74	547	
Stream (Zone)	208	270	55,658		1.30	268	
All Stream	121,996	300,564	63,227,768		2.46	518	
All Types	1,852,475	1,468,016	357,859,728		.79	193	

TABLE NO. 7B - SECOND WORKING

Open Reproduction	112,704	142,636	17,081,882		1.27	151	
Dense Reproduction	7,885	5,768	531,910		.73	67	
Open Pole	52,758	30,792	3,416,892		.58	65	
Dense Pole	7,334	2,877	317,962		.39	43	
Open Mature	40,487	26,674	3,360,658		.66	83	
Dense Mature	1,952	678	73,396		.35	38	
Cutover	39,829	47,303	13,484,490		1.19	339	
Brush	2,214	2,113	219,842		.95	99	
Burn	589	863	526,054		1.47	893	
Subalpine	231	142	10,438		.61	45	
Meadow-Field	10	1	72		.10	7	
All Upland	265,993	259,847	38,973,096		.98	147	
Stream (Hand)	45,362	58,868	10,044,179		1.30	221	
Stream (Chemical)	8,692	12,517	692,435	230,875	1.44	80	27
Stream (Slash)	53	796	17,294		15.02	326	
Stream (Machine)	102	458	46,500		4.49	456	
Stream (Zone)	4,143	2,998	451,769		.72	109	
All Stream	49,660	75,637	11,252,177		1.52	227	
All Types	315,653	335,484	50,225,273		1.06	159	

TABLE NO. 7C - THIRD WORKING

Open Reproduction	10,051	12,459	1,026,602		1.24	102	
Dense Reproduction	123	165	30,548		1.34	248	
Open Pole	2,867	2,115	278,368		.74	97	
Dense Pole	201	111	6,049		.55	30	
Open Mature	2,039	1,118	140,874		.55	69	
Cutover	8,926	11,598	1,307,620		1.30	146	
Brush	287	196	17,911		.65	62	
Subalpine	88	39	5,348		.44	61	
All Upland	24,582	27,791	2,813,320		1.13	114	
Stream (Hand)	11,025	13,564	1,920,595		1.23	174	
Stream (Chemical)	991	754	49,629	16,543	.76	50	17
Stream (Slash)	40	642	20,000		16.05	500	
All Stream	11,025	14,960	1,990,224		1.36	181	
All Types	35,607	42,751	4,803,544		1.20	135	

TABLE NO. 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1940
INLAND EMPIRE

State	Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis	
							Man Days	Ribes
Idaho	First	EQ-Reg.	44,572	15,195	3,913,072		.34	88
		FS-Reg.	138,101	152,326	41,093,377	280,205	1.10	298
		EQ-NIRA	61,375	37,916	13,414,672	24,200	.62	219
		FS-NIRA	270,392	160,637	47,282,390	113,170	.59	175
		EQ-ERA	335,559	251,338	63,882,328	128,289	.75	190
		FS-ERA	34,628	34,208	6,859,911		.99	198
		Cooperative	219,676	104,078	30,882,002	339,769	.47	141
		F-CCC	749,743	410,931	83,083,014	315,742	1.17	238
		S&P-CCC	166,813	127,659	26,122,385	234,341	.77	156
		Total	1,620,859	1,294,288	316,533,141	1,435,716	.90	195
	Second	FS-Reg.	83,026	82,896	11,747,001	42,352	1.00	141
		EQ-NIRA	2,818	1,888	451,021	3,355	.67	160
		FS-NIRA	16,342	7,262	966,499	8,007	.44	59
		EQ-ERA	99,446	94,159	17,225,390	52,956	.95	173
		FS-ERA	14,822	12,817	1,331,586	2,044	.86	90
		Cooperative	9,548	6,441	991,794	13,227	.67	104
		F-CCC	48,123	83,794	8,315,663	47,292	1.74	173
		S&P-CCC	15,283	19,430	4,510,398	51,086	1.27	295
		Total	289,408	308,677	45,539,452	220,329	1.07	157
	Third	FS-Reg.	9,851	10,479	1,348,582	4,130	1.06	137
		FS-NIRA	914	747	127,700	1,922	.82	140
		EQ-ERA	10,093	11,700	1,261,563	5,135	1.16	125
		FS-ERA	771	569	68,599	348	.74	89
		Cooperative	324	72	7,092		.22	22
		F-CCC	7,056	12,471	1,055,302	5,008	1.77	150
		S&P-CCC	846	917	166,678		1.08	197
		Total	29,855	36,955	4,035,516	16,543	1.24	135
	All Workings	EQ-Reg.	44,572	15,195	3,913,072		.34	88
		FS-Reg.	230,978	245,701	54,188,960	326,697	1.06	235
		EQ-NIRA	64,193	39,804	13,865,693	27,555	.62	216
		FS-NIRA	287,648	168,646	48,376,579	123,099	.59	168
		EQ-ERA	445,098	357,197	82,369,281	186,380	.80	185
		FS-ERA	50,221	47,594	8,260,096	2,392	.95	164
		Cooperative	229,548	110,591	31,880,888	352,996	.48	139
		F-CCC	404,922	507,196	92,453,979	368,042	1.25	228
		S&P-CCC	182,942	148,006	30,799,461	285,427	.91	168
		Total	1,940,122	1,639,920	366,108,109	1,672,598	.94	189
Washington	First	FS-Reg.	8,594	10,060	4,100,764		1.17	477
		EQ-NIRA	26,733	11,711	4,348,258		.44	163
		FS-NIRA	34,417	12,708	3,858,496		.37	112
		EQ-ERA	21,423	35,181	10,074,443		1.64	470
		F-CCC	19,741	21,426	3,254,404		1.09	165
		Total	110,908	91,106	25,636,365		.82	231
	Second	FS-Reg.	3,829	2,238	717,619		.58	187
		EQ-ERA	11,617	12,000	2,608,061		1.03	225
		FS-ERA	1,949	1,678	154,764		.86	79
		F-CCC	2,587	3,279	232,829		1.27	90
		Total	19,982	19,195	3,713,273		.96	186
	Third	EQ-ERA	3,902	3,139	625,695		.80	160
	All Workings	FS-Reg.	12,423	12,318	4,818,383		.99	388
		EQ-NIRA	26,733	11,711	4,348,258		.44	163
		FS-NIRA	34,417	12,708	3,858,496		.37	112
		EQ-ERA	36,942	50,319	13,308,199		1.36	360
		FS-ERA	1,949	1,678	154,764		.86	79
		F-CCC	22,328	24,705	3,487,233		1.11	156
		Total	134,792	113,439	29,975,333		.84	222
Montana	First	EQ-Reg.	1,393	2,315	462,300	30,665	1.67	334
		FS-Reg.	8,656	9,565	1,446,312	2,452	1.11	167
		EQ-NIRA	21,773	8,027	2,158,067		.37	99
		FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211
		EQ-ERA	42,313	20,386	3,292,671	1,330	.48	78
		FS-ERA	10,710	15,783	2,382,840	10,191	1.47	222
		F-CCC	13,658	9,757	1,263,790	2,780	.71	93
		Total	120,708	82,622	15,690,222	57,825	.68	130
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		FS-Reg.	1,820	1,491	151,306	5,376	.82	83
		EQ-ERA	1,342	1,597	265,637		1.19	198
		FS-ERA	2,080	2,456	202,732	1,040	1.18	97
		F-CCC	402	1,088	53,463		2.71	133
		Total	6,263	7,612	972,548	10,546	1.22	155
	Third	FS-Reg.	1,052	1,813	77,224		1.72	73
		EQ-ERA	648	777	59,040		1.20	91
		FS-ERA	150	68	6,069		.45	40
		Total	1,850	2,658	142,333		1.44	77
	All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
		FS-Reg.	11,528	12,869	1,674,842	7,828	1.12	145
		EQ-NIRA	21,773	8,027	2,158,067		.37	99
		FS-NIRA	22215	16,789	4,684,242	10,417	.76	211
		EQ-ERA	44,303	22076	3,617,348	1,330	.51	82
		FS-ERA	12,940	18730	2,591,641	11,221	1.41	200
		F-CCC	14,060	10,845	1,317,253	2,780	.77	94
		Total	128,821	92,892	16,805,103	68,371	.72	130
Idaho Washington Montana	First	EQ-Reg.	45,955	17,510	4,375,372	30,665	.38	95
		FS-Reg.	155,351	171,971	46,540,453	282,657	1.11	300
		EQ-NIRA	109,881	57,654	19,920,997	24,200	.52	181
		FS-NIRA	327,024	190,134	55,825,118	123,587	.58	171
		EQ-ERA	399,295	306,905	77,249,442	129,619	.77	193
		FS-ERA	45,338	49,991	9,242,751	10,181	1.10	204
		Cooperative	219,676	104,078	30,882,002	339,769	.47	141
		F-CCC	397,142	442,114	87,601,208	318,522	1.15	229
		S&P-CCC	166,813	127,659	26,122,385	234,341	.77	156
		Total	1,852,475	1,468,016	357,859,728	1,493,541	.79	193
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		FS-Reg.	88,675	86,625	12,615,926	47,738	.98	142
		EQ-NIRA	2,818	1,888	451,021	3,355	.67	160
		FS-NIRA	16,342	7,262	966,499	8,007	.44	59
		EQ-ERA	112,405	107,756	20,099,088	52,956	.96	179
		FS-ERA	18,851	16,951	1,689,182	3,084	.90	90
		Cooperative	9,548	6,441	991,794	13,227	.67	104
		F-CCC	51,112	88,151	8,601,955	47,292	1.72	168
		S&P-CCC	15,283	19,430	4,510,398	51,086	1.27	295
		Total	315,653	335,484	50,825,273	235,875	1.06	159
	Third	FS-Reg.	10,903	12,292	1,425,806	4,130	1.13	131
		FS-NIRA	914	747	127,700	1,922	.82	140
		EQ-ERA	14,543	15,615	1,946,298	5,135	1.07	133
		FS-ERA	921	637	74,668	348	.69	81
		Cooperative	324	72	7,092		.22	22
		F-CCC	7,056	12,471	1,055,302	5,008	1.77	150
		S&P-CCC	846	917	166,678		1.08	197
		Total	35,507	42,751	4,803,544	16,543	1.20	135
	All Workings	EQ-Reg.	46,574	18,490	4,674,782	34,795	.40	100
		FS-Reg.	254,929	270,888	60,582,185	334,525	1.06	238
		EQ-NIRA	112,699	59,542	20,372,018	27,555	.53	181
		FS-NIRA	344,280	198,143	56,919,317	133,516	.58	165
		EQ-ERA	526,343	430,276	99,294,828	187,710	.82	189
		FS-ERA	65,110	67,579	11,006,601	13,613	1.04	169
		Cooperative	229,548	110,591	31,880,888	352,996	.48	139
		F-CCC	441,310	542,736	97,258,465	370,822	1.23	220
		S&P-CCC	182,942	148,006	30,799,461	285,427	.81	168
		Total	2,203,735	1,846,251	412,988,545	1,740,959	.84	187

TABLE NO. 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1940
INLAND EMPIRE

State	Working	Number of Acres Worked by Ownership Classes					Total
		Federal			State	Private	
		Forest Service	Public Domain	Total			
Idaho	First	852,677	16,482	869,159	263,414	488,286	1,620,859
	Second	160,502	4,992	165,494	39,578	84,336	289,408
	Third	16,373	142	16,515	3,823	9,517	29,855
	Total	1,029,552	21,616	1,051,168	306,815	582,139	1,940,122
Washington	First	56,663	315	56,978	6,832	47,098	110,908
	Second	6,448	60	6,508	3,935	9,539	19,982
	Third				2,114	1,788	3,902
	Total	63,111	375	63,486	12,881	58,425	134,792
Montana	First	100,006		100,006	696	20,006	120,708
	Second	4,305		4,305		1,958	6,263
	Third	774		774		1,076	1,850
	Total	105,085		105,085	696	23,040	128,821
Total	First	1,009,346	16,797	1,026,143	270,942	555,390	1,852,475
	Second	171,255	5,052	176,307	43,513	95,833	315,653
	Third	17,147	142	17,289	5,937	12,381	35,607
	Total	1,197,748	21,991	1,219,739	320,392	663,604	2,203,735

TABLE NO. 10

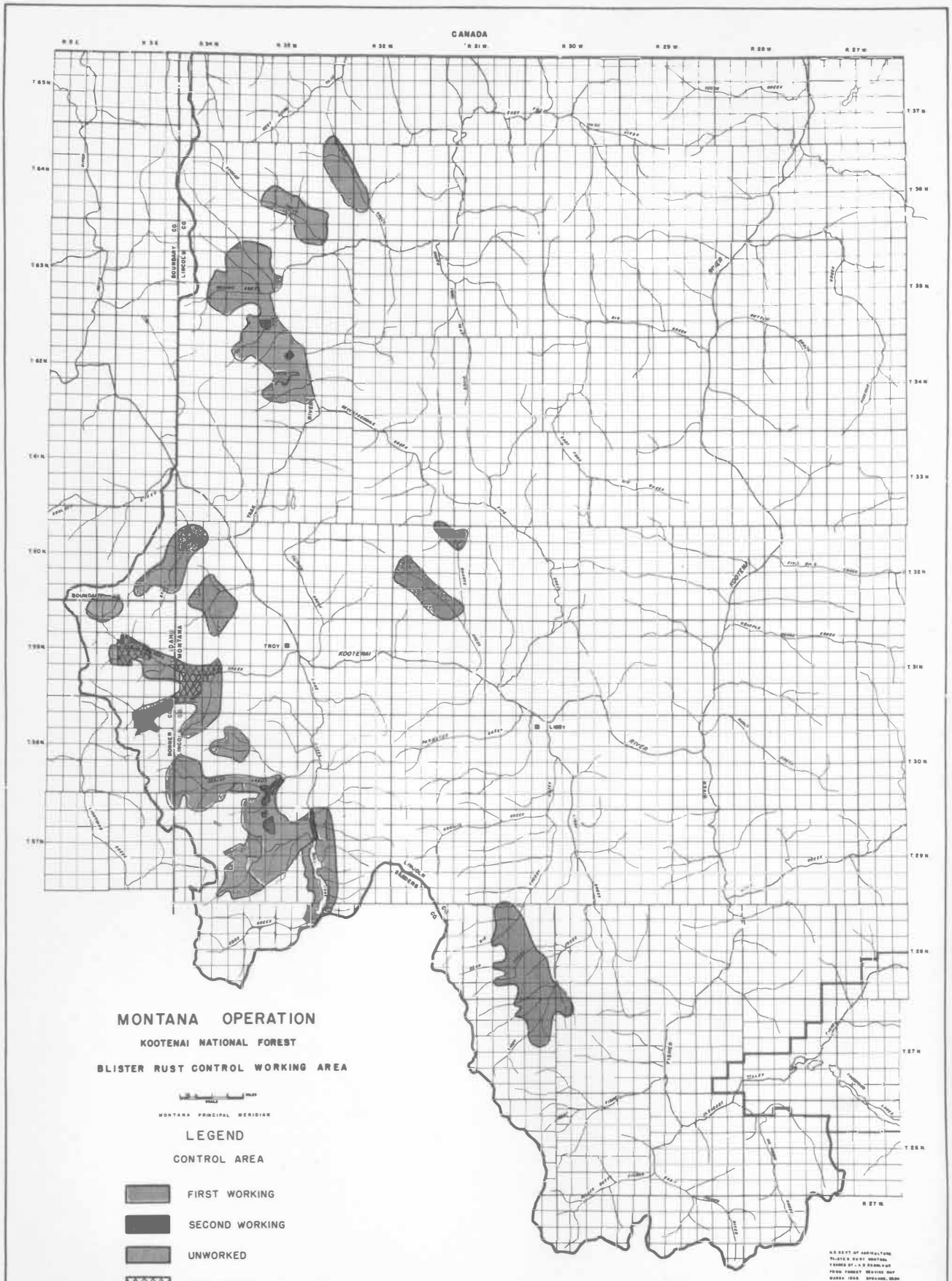
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1940
INLAND EMPIRE

State	Ownership Class	Number of Acres			Acres Mature Stands on Which Working is deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	Forest Service	852,677	247,161	1,099,838	30,252	1,130,090
	Public Domain	16,482	14,068	30,550	1,040	31,590
	Sub-total Federal	869,159	261,229	1,130,388	31,292	1,161,680
	State	263,414	49,456	312,870	32,080	344,950
	Private	488,286	222,197	710,483	90,542	801,025
	Total	1,620,859	532,882	2,153,741	153,914	2,307,655
Washington	Forest Service	56,663	35,227	91,890		91,890
	Public Domain	315		315		315
	Sub-total Federal	56,978	35,227	92,205		92,205
	State	6,832	3,018	9,850		9,850
	Private	47,098	11,942	59,040		59,040
	Total	110,908	50,187	161,095		161,095
Montana	Forest Service	100,006	49,813	149,819	13,706	163,525
	State	696	234	930		930
	Private	20,006	13,789	33,795	2,490	36,285
	Total	120,708	63,836	184,544	16,196	200,740
Total	Forest Service	1,009,346	332,201	1,341,547	43,958	1,385,505
	Public Domain	16,797	14,068	30,865	1,040	31,905
	Sub-total Federal	1,026,143	346,269	1,372,412	44,998	1,417,410
	State	270,942	52,708	323,650	32,080	355,730
	Private	555,390	247,928	803,318	93,032	896,350
	Total	1,852,475	646,905	2,499,380	170,110	2,669,490

TABLE NO. 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1940
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species								Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	Ribes acerifolium	
First	Open Reproduction	475,300	44,606,285	122,554,254	180,592	1,071,450	469,314	1,176	1,145		168,884,216
	Dense Reproduction	93,476	3,159,053	2,759,118	15,767	104,631	34,813	2,279			6,075,661
	Open Pole	280,078	12,480,358	11,864,707	63,582	349,667	223,045		462	3,914	24,985,735
	Dense Pole	71,126	1,471,667	884,152	1,651	36,301	10,420				2,404,191
	Open Mature	652,670	43,050,004	21,957,661	225,205	363,002	470,186	7,069	26	2,027	66,075,180
	Dense Mature	69,024	818,347	249,393	1,104	42,382	2,839	188			1,114,253
	Cutover	48,513	5,728,273	10,453,506	43,873	90,333	38,795				16,354,780
	Brush	24,323	1,522,287	3,187,593	19,257	97,116	20,835				4,847,088
	Burn	10,135	706,582	2,671,736	8,895	18,433	9,292				3,414,938
	Subalpine	3,255	326,851	136,917		19					463,787
	Meadow-Field	2,569	5,010			7,121					12,131
	All Upland	1,730,479	113,874,717	176,719,037	559,926	2,180,455	1,279,539	10,712	1,633	5,941	294,631,960
	Stream	121,996	41,728,637	1,990,370	6,310,427	13,009,370	116,220	31,905	21,255	19,584	63,227,768
	All Types	1,852,475	155,603,354	178,709,407	6,870,353	15,189,825	1,395,759	42,617	22,888	25,525	357,859,728
Second	Open Reproduction	112,704	5,639,125	11,235,002	47,795	85,133	24,236		2,591		17,031,882
	Dense Reproduction	7,885	360,742	169,454	4	1,627	83				531,910
	Open Pole	52,758	1,727,048	1,637,923	18,708	30,977	1,736				3,416,392
	Dense Pole	7,334	238,196	73,045	3,960	2,761					317,962
	Open Mature	40,487	1,801,890	1,500,992	16,086	14,440	26,983		267		3,360,658
	Dense Mature	1,952	59,675	12,838		658	225				73,396
	Cutover	39,829	3,107,822	10,276,846	66,732	22,535	10,555				13,484,490
	Brush	2,214	68,503	150,464		875					219,842
	Burn	589	111,220	409,387	5,447						526,054
	Subalpine	231	5,431	5,007							10,438
	Meadow-Field	10	72								72
	All Upland	265,993	13,119,724	25,470,958	158,732	157,006	63,818		2,858		38,973,096
	Stream	49,660	6,450,060	768,746	1,914,696	1,932,432	31,532		154,711		11,252,177
	All Types	315,653	19,569,784	26,239,704	2,073,428	2,089,438	95,350		157,569		50,225,273
Third	Open Reproduction	10,051	542,597	474,531	7,468	1,806	200				1,026,602
	Dense Reproduction	123	24,708	5,840							30,548
	Open Pole	2,867	170,287	108,058	17		6				278,368
	Dense Pole	201	5,752	297							6,049
	Open Mature	2,039	104,384	36,490							140,874
	Cutover	8,926	611,478	681,864	14,135		143				1,307,620
	Brush	287	4,915	12,996							17,911
	Subalpine	88	2,510	2,838							5,348
	All Upland	24,582	1,466,631	1,322,914	21,620	1,806	349				2,813,320
	Stream	11,025	965,470	27,943	515,453	478,976			2,382		1,990,224
	All Types	35,607	2,432,101	1,350,857	537,073	480,782	349		2,382		4,803,544
All Workings	Open Reproduction	598,055	50,788,007	134,263,787	235,855	1,156,389	493,750	1,176	3,736		186,942,700
	Dense Reproduction	101,484	3,544,503	2,934,412	15,771	106,258	34,896	2,279			6,638,119
	Open Pole	335,703	14,377,693	13,610,688	82,307	380,644	224,787		462	3,914	28,680,495
	Dense Pole	78,671	1,715,615	957,494	5,611	39,062	10,420				2,728,202
	Open Mature	695,196	44,956,278	23,495,143	241,291	377,442	497,169	7,069	293	2,027	69,576,712
	Dense Mature	70,976	878,022	262,231	1,104	43,040	3,064	188			1,187,649
	Cutover	97,268	9,447,573	21,412,216	124,740	112,868	49,493				31,146,890
	Brush	26,824	1,595,705	3,351,053	19,257	97,991	20,835				5,084,841
	Burn	10,724	817,802	3,081,123	14,342	18,433	9,292				3,940,992
	Subalpine	3,574	334,792	144,762		19					479,573
	Meadow-Field	2,579	5,082			7,121					12,203
	All Upland	2,021,054	128,461,072	203,512,909	740,278	2,339,267	1,343,706	10,712	4,491	5,941	336,418,376
	Stream	182,681	49,144,167	2,787,059	8,740,576	15,420,778	147,752	31,905	178,348	19,584	76,470,169
	All Types	2,203,735	177,605,239	206,299,968	9,480,854	17,760,045	1,491,458	42,617	182,839	25,525	412,888,545


CANADA
BOUNDARY CO.
LINCOLN CO.
BONNER CO.
IDAHO
MONTANA
TROY
LIBBY
KOOTENAI
KOOTENAI RIVER
MONTANA OPERATION
KOOTENAI NATIONAL FOREST
BLISTER RUST CONTROL WORKING AREA
MONTANA PRINCIPAL MERIDIAN
LEGEND
CONTROL AREA
FIRST WORKING
SECOND WORKING
UNWORKED
1940 WORK
ANNUAL REPORT 1940
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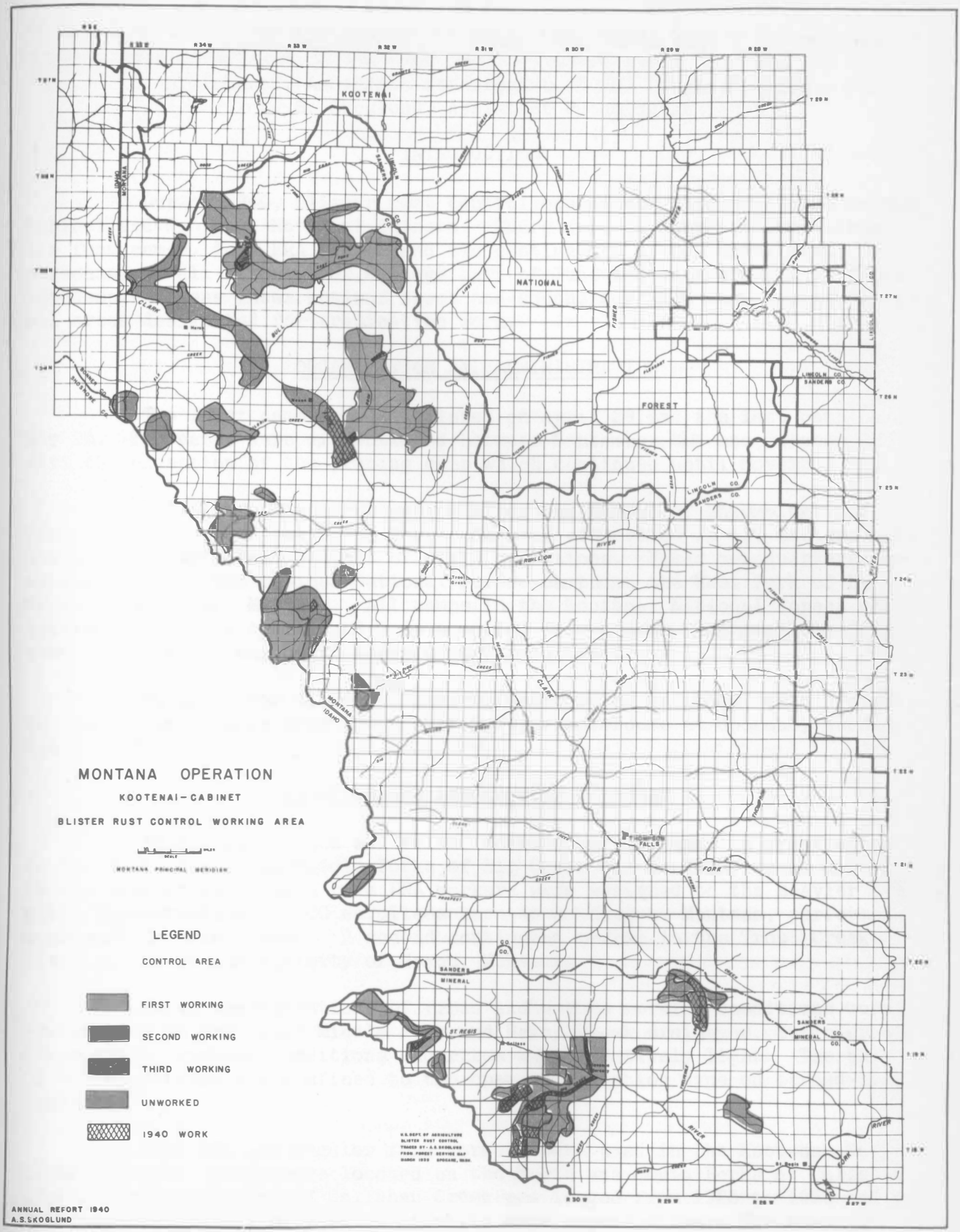


ANNUAL REPORT 1940
A.S. SKOGLUND

RIBES ERADICATION, MONTANA OPERATION, 1940

By
C. H. Johnson, Associate Pathologist, U. S. Forest Service
A. S. Skoglund, Assistant Pathologist

INTRODUCTION

During 1940, blister rust control operations were conducted in the Cabinet and Kootenai National Forests. There were in operation three regular fund camps, four ERA camps, and two contingents of CCC enrollees. The personnel of all camps spent a large part of June and most of July on fires, but despite these interruptions first and second workings were extended over all areas designated for eradication work.

ORGANIZATION AND ADMINISTRATION

The first camp was established on April 29 and the last camp on May 25. The camps were discontinued between September 28 and October 21 with the exception of the pruning camp which continued until November 10.

Blister rust control personnel of the Bureau of Entomology and Plant Quarantine and the U. S. Forest Service cooperated in all matters relative to the efficient conduct of field operations. Field headquarters were established for the Cabinet National Forest camps on the East Fork of Big Creek near Haugan, Montana. All camps in the Kootenai National Forest were located along pack trails and were supplied from a base camp near the junction of the North and South Forks of Callahan Creek.

Supplies for all camps were transported by railroad, auto freight, and Government trucks from the Forest Service warehouse at Spokane, Washington.

LOCATION AND DESCRIPTION OF AREAS

Both regular fund and relief workers were engaged in eradication on the East, West, and Middle Forks of Big Creek and on Rainy Creek and Twelve Mile Creeks. As a rule ERA workers were assigned to the heavier ribes concentrations. CCC enrollees located at Haugan, Montana, performed some work on Rainy Creek. A second contingent worked in the Trout Creek District and in the vicinity of Noxon, Montana.

Heavy concentrations of ribes and severe working conditions were encountered in the Upper Middle Fork and Rainy Creek drainages, but over all other areas, working conditions and ribes were relatively light. The bulk of all operations was confined to the open reproduction type on burned-over lands.

Only ERA and regular fund workers were used in the Kootenai National Forest. Camps were located on the North and South Forks of Callahan Creek. The South Fork of Callahan Creek was logged from 1923 to 1926 and is now supporting a splendid stand of white pine reproduction. The area is

rugged, but it was not necessary to extend eradication beyond the previous cutting limits. Ribes concentrations and working conditions were of varying intensities, ranging from light to very heavy.

METHODS AND EQUIPMENT

Two-man crews with string lines in place proved the more satisfactory method of procedure for initial work. On second working over open sites, larger crews stringing lines as they progressed yielded good results.

During the past season particular attention was given to the matter of working short strips within blocks ranging from three to ten acres in extent. No comparative tests were made to determine the advantage of short strips over long strips, but it is believed that in heavy concentrations there is an increase in the amount of work a man will accomplish in a day.

From a limited amount of work performed in connection with the short strip procedure, the following points favoring this practice have been observed:

1. Greater uniformity of motion by workers maintained throughout the day.
2. Better supervision due to the fact that men were confined to definite limits and had equality in working conditions.
3. Clearer picture as to what constituted an acre of ground.

TAGGING METHOD

Tagging was continued on a limited scale with the dual purpose of determining the value of a 100 per cent advance survey before eradication and of learning what could be accomplished toward finding a larger percentage of ribes commonly missed by eradicators. A complete report of tagging as studied by the methods development project will be presented as a separate paper.

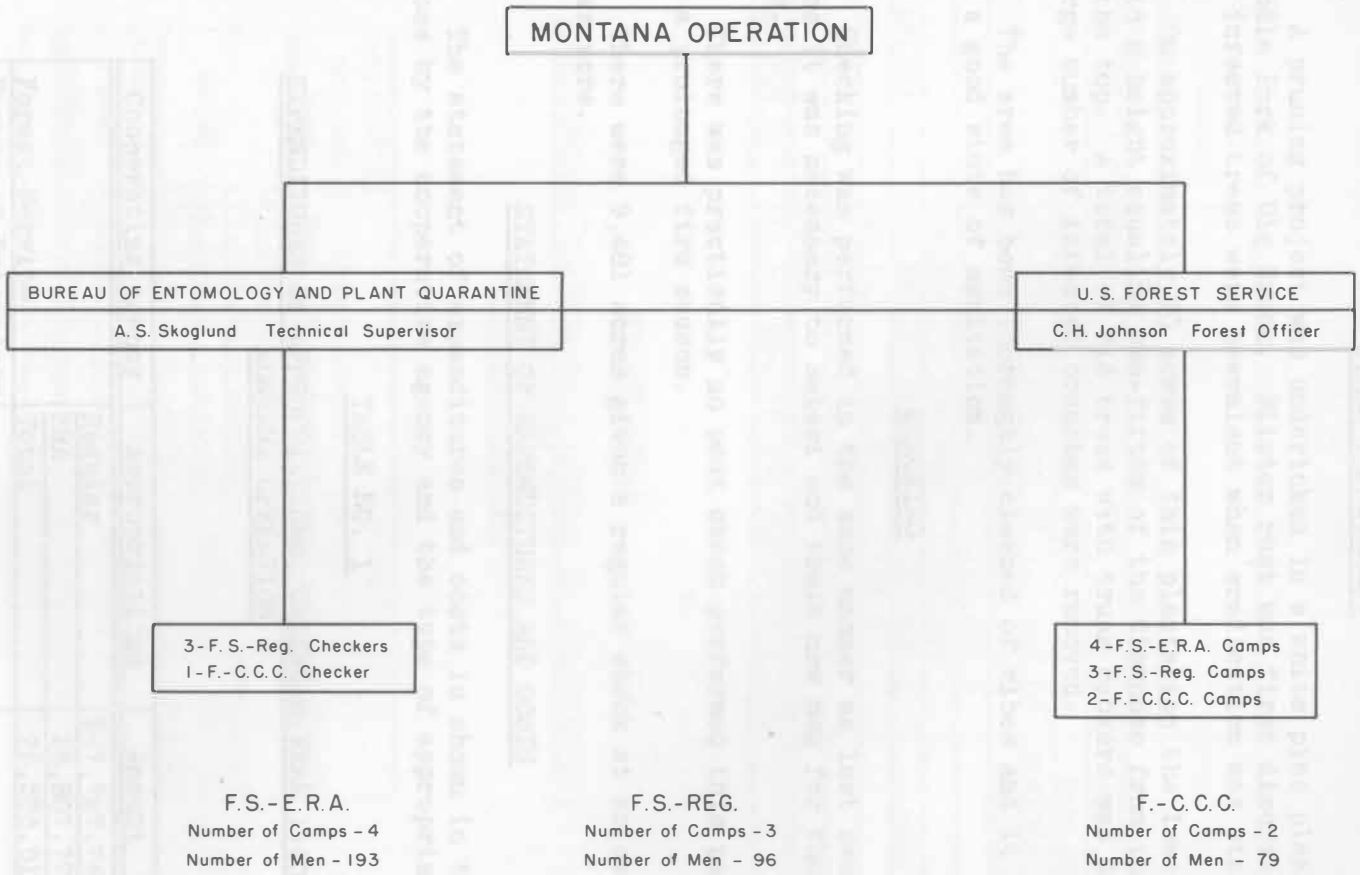
ERADICATION AND PLANTING

Eradication of ribes in conjunction with a white pine planting operation was inaugurated in the Trout Creek District. A four-man eradication crew was assigned to follow a regular planting crew.

On light areas it was found that those engaged at planting detained the eradicators, but the opposite situation existed when ribes averaged 500 to 700 per acre. The outcome was that each group maintained its normal pace and functioned independently.

A distinct advantage was that eradicators used the same camp and obtained transportation close to the scene of action. The heaviest ribes concentration occurred at the upper limits of the planting site and ordinarily the area would have been reached by foot, thus necessitating approximately two hours' walking time.

ORGANIZATION CHART



Total Number of Men on Blister Rust Work – 368

1940

It is planned to conduct eradication along with planting when operations are again resumed.

STAND IMPROVEMENT

A pruning project was undertaken in a white pine plantation on the Lower Middle Fork of Big Creek. Blister rust was first discovered there in 1929 and infected trees were prevalent when eradication was started in 1937.

On approximately 70 acres of this plantation the lower limbs were removed to a height equaling two-fifths of the distance from the base of the tree to the top. A total of 316 trees with trunk cankers was destroyed; also, a large number of infected branches were removed.

The area has been thoroughly cleaned of ribes and it is believed to be in a good state of sanitation.

CHECKING

Checking was performed in the same manner as last season. Due to promotions it was necessary to select and train new men for the checking positions.

There was practically no post check performed this past season because of a prolonged fire season.

There were 9,481 acres given a regular check at an average cost of $0.093 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tabulations by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
MONTANA OPERATION

Cooperating Agency	Appropriations	Amount
Forest Service	Regular	$47,727.74
	ERA	28,807.77
	Total	76,535.51
Bureau of Entomology and Plant Quarantine	Regular	2,882.94
Total Expenditures	All Appropriations	$79,418.45

Note:	Regular	ERA	Total
Cabinet	$21,563.46	$13,907.48	$35,470.94
Kootenai	26,164.28	14,900.29	41,064.57

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
MONTANA OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine	
	Regular	ERA	Total	Regular	Total
Salaries, perm. men	$ 3,300.00		$ 3,300.00	$2,700.00	$ 6,000.00
Salaries, temp. men	11,875.99	$ 3,233.89	15,109.88		15,109.88
Wages, temp. laborers	20,594.82	17,274.23	37,869.05		37,869.05
Subsistence supplies	5,971.01	5,926.18	11,897.19		11,897.19
Equipment	4,039.94	214.84	4,254.78		4,254.78
Trucks	226.18	477.05	703.23		703.23
Travel and transp.	1,398.58	899.92	2,298.50	182.94	2,481.44
Chemicals	7.96	113.06	121.02		121.02
Twine	129.60	662.40	792.00		792.00
Other supplies	183.66	6.20	189.86		189.86
Total	$47,727.74	$28,807.77	$76,535.51	$2,882.94	$79,418.45

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
MONTANA OPERATION

Program	Number Effective Man Days	Expenditures According to Fund		Effective Man Day Cost
Combined FS-ERA FS-Reg.	9,230	FS-Reg.	$45,826.74	$8.36
		FS-ERA	28,807.77	
		EQ-Reg.	2,482.94	
		Total	77,117.45	
CCC	1,055	FS-Reg.	1,901.00	CCC Funds not included
		EQ-Reg.	400.00	
		Total	2,301.00	
Total Cost 1940 Program			$79,418.45	

Number meals served 57,250 Average cost per meal $0.207
Pounds of twine 750 Pounds of chemical 7,000

SUMMARY OF RIBES ERADICATION, 1940
MONTANA OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
									Bushes	Live Stem
Kootenai	Open Reproduction	1,567			1,567	2,723	218,115		2.0	7.9
	Dense Reproduction	202			202	349	16,613		4.1	23.8
	Open Pole	2,546			2,546	576	38,057		1.6	11.7
	Dense Pole	134			134	1			1.2	3.2
	Open Mature	350			350	2	4		.4	7.5
	Dense Mature	280			280	1	19		0	0
	Brush	128			128	1	4		.9	5.6
	All Upland	5,207			5,207	3,653	272,812		1.6	10.1
	Stream (Hand)	450			450	1,471	106,733		3.5	12.6
	All Types	5,657			5,657	5,124	379,545		2.0	10.5
Cabinet	Open Reproduction	754	1,344	295	2,393	2,958	316,614		4.9	26.7
	Open Pole	2,135	77		2,212	225	20,208		2.4	16.0
	Open Mature	823	12		835	686	111,003		4.4	32.4
	All Upland	3,712	1,433	295	5,440	3,869	447,825		4.0	15.9
	Stream (Hand)	100	184	72	356	1,017	135,542			
	Stream (Chemical)	28	33		61	188	11,832	3,944		
	All Stream	100	184	72	356	1,205	147,374		6.7	17.0
	All Types	3,812	1,617	367	5,796	5,074	595,199		4.0	15.9
Savenac Nursery	Open Reproduction		29		29	17	1,356			
	Stream (Hand)		46	96	142	70	4,752			
	All Types		75	96	171	87	6,109			
All Forests	Open Reproduction	2,321	1,373	295	3,989	5,698	536,085		3.6	18.6
	Dense Reproduction	202			202	349	16,613		4.1	23.8
	Open Pole	4,681	77		4,758	801	58,265		1.9	12.9
	Dense Pole	134			134	1			1.2	3.2
	Open Mature	1,173	12		1,185	688	111,007		2.7	21.8
	Dense Mature	280			280	1	19		0	0
	Brush	128			128	1	4		.9	5.6
	All Upland	8,919	1,462	295	10,676	7,539	721,993		2.6	15.6
	Stream (Hand)	550	230	168	948	2,558	247,027			
	Stream (Chemical)	28	33		61	188	11,832	3,944		
	All Stream	550	230	168	948	2,746	258,859		3.7	12.8
	All Types	9,469	1,692	463	11,624	10,285	980,852		2.7	15.3

TABLE NO. 3A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray	Ribes Remaining Per Acre Bushes	Ribes Remaining Per Acre Live Stem
Kootenai	Open Reproduction	1,567	2,723	218,115		1.74	139		2.0	7.9
	Dense Reproduction	202	349	16,613		1.73	82		4.1	23.8
	Open Pole	2,546	576	38,057		.23	15		1.6	11.7
	Dense Pole	134	1			.01			1.2	3.2
	Open Mature	350	2	4		.01	1		.4	7.5
	Dense Mature	280	1	19		.01	1		0	0
	Brush	128	1	4		.01	1		.9	5.6
	All Upland	5,207	3,653	272,812		.70	52		1.6	10.1
	Stream (Hand)	450	1,471	106,733		3.27	237		3.5	12.6
	All Types	5,657	5,124	379,545		.91	67		2.0	10.5
Cabinet	Open Reproduction	754	1,356	199,663		1.80	265		4.9	49.5
	Open Pole	2,135	165	14,506		.08	7		2.4	16.0
	Open Mature	823	671	109,547		.82	133		4.4	32.4
	All Upland	3,712	2,192	323,716		.59	87		3.6	29.3
	Stream (Hand)	100	760	116,227		7.60	1,162			
	Stream (Chemical)	28	28	2,178	726	1.00	78	26		
	All Stream	100	788	118,405		7.88	1,184		6.7	17.0
	All Types	3,812	2,980	442,121		.78	116		3.7	28.9
All Forests	Open Reproduction	2,321	4,079	417,778		1.76	180		3.0	21.7
	Dense Reproduction	202	349	16,613		1.73	82		4.1	23.8
	Open Pole	4,681	741	52,563		.16	11		1.9	12.9
	Dense Pole	134	1			.01			1.2	3.2
	Open Mature	1,173	673	109,551		.57	93		2.7	21.8
	Dense Mature	280	1	19		.01	1		0	0
	Brush	128	1	4		.01	1		.9	5.6
	All Upland	8,919	5,845	596,528		.66	67		2.2	16.0
	Stream (Hand)	550	2,231	222,960		4.06	405			
	Stream (Chemical)	28	28	2,178	726	1.00	78	26		
	All Stream	550	2,259	225,138		4.11	409		3.7	12.8
	All Types	9,469	8,104	821,666		.85	87		2.4	15.5

TABLE NO. 3B - SECOND WORKING

Cabinet	Open Reproduction	1,344	1,482	105,157		1.10	78		3.5	10.7
	Open Pole	77	60	5,702		.78	74			
	Open Mature	12	15	1,456		1.25	121			
	All Upland	1,433	1,557	112,315		1.09	78			
	Stream (Hand)	184	217	14,101		1.18	77			
	Stream (Chemical)	33	160	9,654	3,218	4.85	293	98		
	All Stream	184	377	23,755		2.05	129			
	All Types	1,617	1,934	136,070		1.20	84			
Savenac Nursery	Open Reproduction	29	17	1,356		.59	47			
	Stream (Hand)	46	22	1,624		.48	35			
	All Types	75	39	2,990		.52	40			
All Forests	Open Reproduction	1,373	1,499	106,513		1.09	78			
	Open Pole	77	60	5,702		.78	74			
	Open Mature	12	15	1,456		1.25	121			
	All Upland	1,462	1,574	113,671		1.08	78			
	Stream (Hand)	230	239	15,725		1.04	68			
	Stream (Chemical)	33	160	9,654	3,218	4.85	293	98		
	All Stream	230	399	25,379		1.73	110			
	All Types	1,692	1,973	139,050		1.17	82			

TABLE NO. 3C - THIRD WORKING

Cabinet	Open Reproduction	295	120	11,794		.41	40		7.8	18.5
	Stream (Hand)	72	40	5,214		.56	72			
	All Types	367	160	17,008		.44	46			
Savenac Nursery	Stream (Hand)	96	48	3,128		.50	33			
All Forests	Open Reproduction	295	120	11,794		.41	40			
	Stream (Hand)	168	88	8,342		.52	50			
	All Types	463	208	20,136		.45	43			

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
MONTANA OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Sprayed	Bushes	Live Stem
First	FS-ERA	4,479	4,382	428,764	726	.98	96	26	3.0	24.7
	FS-Reg.	3,121	3,366	352,890		1.08	113		2.5	8.8
	F-CCC	1,869	356	40,012		.19	21		.2	1.1
	Total	9,469	8,104	821,666	726	.86	87		2.4	15.5
Second	FS-ERA	371	556	47,584		1.50	128			
	FS-Reg.	1,082	718	61,616	3,218	.66	57	98	3.3	9.7
	F-CCC	239	699	29,850		2.92	125		4.6	18.9
	Total	1,692	1,973	139,050	3,218	1.17	82		3.5	10.7
Third	FS-ERA	150	68	6,069		.45	40			
	FS-Reg.	313	140	14,067		.45	45		7.8	18.5
	Total	463	208	20,136		.45	43		7.8	18.5
All Workings	FS-ERA	5,000	5,006	482,417	726	1.00	96	26	3.0	24.7
	FS-Reg.	4,516	4,224	428,573	3,218	.94	95	98	3.0	9.7
	F-CCC	2,108	1,055	69,862		.50	33		.5	2.3
	Total	11,624	10,285	980,852	3,944	.88	84	65	2.7	15.3

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service		
		Forest Service	Private	Total
Kootenai	First	5,580	77	5,657
Cabinet	First	2,293	1,519	3,812
	Second	1,195	422	1,617
	Third	367		367
	Total	3,855	1,941	5,796
Savenac Nursery	Second	49	26	75
	Third	72	24	96
	Total	121	50	171
All Forests	First	7,873	1,596	9,469
	Second	1,244	448	1,692
	Third	439	24	463
	Total	9,556	2,068	11,624

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
MONTANA OPERATION

Forest	Eradication Type	Average Results for All Areas				Areas with More Than 25 Feet Live Stem Per Acre		
		Acres in Checked Area	Acres Checked	Ribes per Acre			Ribes per Acre	
				Bushes	Live Stem	Acres	Bushes	Live Stem
Kootenai	Open Reproduction	1,224	48.26	2.0	7.9	42	25.8	116.5
	Dense Reproduction	168	6.84	4.1	23.8			
	Open Pole	2,623	100.64	1.6	11.7	69	11.1	68.6
	Dense Pole	134	4.04	1.2	3.2			
	Open Mature	350	13.82	.4	7.5			
	Dense Mature	280	6.84	0	0			
	Brush	128	4.68	.9	5.6			
	All Upland	4,907	185.12	1.6	10.1	11.	16.7	86.7
	Stream	354	42.82	3.5	12.6	25	30.0	115.0
	All Types	5,261	227.94	2.0	10.5	136	19.1	91.8
Cabinet	Open Reproduction	1,695	64.14	4.9	26.7	72	23.2	122.6
	Open Pole	1,995	40.70	2.4	16.0	101	11.9	85.6
	Open Mature	504	18.62	4.4	32.4	62	15.6	100.8
	All Upland	4,194	123.46	4.0	15.9	235	17.7	105.6
	Stream	26	2.82	6.7	17.0	15	26.7	38.3
	All Types	4,220	126.28	4.0	15.9	250	18.4	100.7
All Forests	Open Reproduction	2,919	112.40	3.6	18.6	114	24.2	120.4
	Dense Reproduction	168	6.84	4.1	23.8			
	Open Pole	4,618	141.34	1.9	12.9	170	11.4	75.7
	Dense Pole	134	4.04	1.2	3.2			
	Open Mature	854	32.44	2.7	21.8	62	15.6	100.8
	Dense Mature	280	6.84	0	0			
	Brush	128	4.68	.9	5.6			
	All Upland	9,101	308.58	2.6	15.6	346	17.3	98.6
	Stream	380	45.64	3.7	12.8	40	28.8	86.3
	All Types	9,481	354.22	2.7	15.3	386	18.7	97.2

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Open Reproduction	2,321	288,458	128,124	20			1,176		417,778
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	4,681	11,365	31,038		8,384	1,776			52,563
	Dense Pole	134								
	Open Mature	1,173	107,990	1,321	240					109,551
	Dense Mature	280	3					16		19
	Brush	128	4							4
	All Upland	8,919	411,307	173,545	260	8,384	1,776	1,256		596,528
	Stream	550	203,226	6,356	9,913	5,357		286		225,138
	All Types	9,469	614,533	179,901	10,173	13,741	1,776	1,542		821,666
Second	Open Reproduction	1,373	75,402	23,562	4,593	18	347		2,591	106,513
	Open Pole	77	1,674			4,028				5,702
	Open Mature	12	1,456							1,456
	All Upland	1,462	78,532	23,562	4,593	4,046	347		2,591	113,671
	Stream	230	7,947	176	6,744	3,927	21		6,564	25,379
	All Types	1,692	86,479	23,738	11,337	7,973	368		9,155	139,050
Third	Open Reproduction	295	5,461	6,333						11,794
	Stream	168	5,476	20	2,833	13				8,342
	All Types	463	10,937	6,353	2,833	13				20,136
All Workings	Open Reproduction	3,989	369,321	158,019	4,613	18	347	1,176	2,591	536,085
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	4,758	13,039	31,038		12,412	1,776			58,265
	Dense Pole	134								
	Open Mature	1,185	109,446	1,321	240					111,007
	Dense Mature	280	3					16		19
	Brush	128	4							4
	All Upland	10,676	495,300	203,440	4,853	12,430	2,123	1,256	2,591	721,993
	Stream	948	216,649	6,552	19,490	9,297	21	286	6,564	258,859
	All Types	11,624	711,949	209,992	24,343	21,727	2,144	1,542	9,155	980,852

SUMMARY OF RIBES ERADICATION, 1928-1940
MONTANA OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Kootenai	Open Reproduction	9,552	261		9,813	7,426	950,047	
	Dense Reproduction	2,952	80		3,032	1,357	151,792	
	Open Pole	15,219	779		15,998	7,599	836,364	
	Dense Pole	3,665			3,665	231	15,607	
	Open Mature	7,819			7,819	3,081	433,339	
	Dense Mature	8,608			8,608	458	48,580	
	Brush	235			235	94	7,956	
	Burn	115			115	1	32	
	Meadow-Field	103			103	1		
	All Upland	48,268	1,120		49,388	20,248	2,443,717	
	Stream (Hand)	3,050	533		3,583	8,982	1,277,034	
	All Types	51,318	1,653		52,971	29,230	3,720,751	
Cabinet	Open Reproduction	23,816	2,157	394	26,367	26,542	5,242,716	
	Dense Reproduction	1,612			1,612	438	71,747	
	Open Pole	19,283	438	38	19,759	8,431	1,524,452	
	Dense Pole	2,619	153	12	2,784	966	211,681	
	Open Mature	8,740	12		8,752	4,374	1,057,218	
	Dense Mature	557			557	88	8,566	
	Brush	2,763			2,763	1,895	573,939	
	Meadow-Field	348			348	150	12,131	
	All Upland	59,738	2,760	444	62,942	42,884	8,702,450	
	Stream (Hand)	3,672	709	72	4,453	11,720	2,897,594	
	Stream (Chemical)	465	111		576	1,446	96,327	32,109
	Stream (Slash)	23			23	215	11,500	
	Stream (Machine)	75			75	644	39,500	
	All Stream	3,770	709	72	4,551	14,025	3,044,921	
	All Types	63,508	3,469	516	67,493	56,909	11,747,371	
Savenac Nursery	Open Reproduction	4,692	164		4,856	898	366,968	
	Dense Reproduction	102			102	3		
	All Upland	4,794	164		4,958	901	366,968	
	Stream (Hand)	1,088	962	1,334	3,384	4,126	723,712	
	Stream (Chemical)	239	62		301	880	200,801	36,262
	Stream (Slash)	45		40	85	810	42,500	
	Stream (Machine)		15		15	36	3,000	
	All Stream	1,088	977	1,334	3,399	5,852	970,013	
	All Types	5,882	1,141	1,334	8,357	6,753	1,336,981	
All Forests	Open Reproduction	38,060	2,582	394	41,036	34,866	6,559,731	
	Dense Reproduction	4,666	80		4,746	1,798	223,539	
	Open Pole	34,502	1,217	38	35,757	16,030	2,360,816	
	Dense Pole	6,284	153	12	6,449	1,197	227,288	
	Open Mature	16,559	12		16,571	7,455	1,490,557	
	Dense Mature	9,165			9,165	546	57,146	
	Brush	2,998			2,998	1,989	581,895	
	Burn	115			115	1	32	
	Meadow-Field	451			451	151	12,131	
	All Upland	112,800	4,044	444	117,288	64,033	11,513,135	
	Stream (Hand)	7,810	2,204	1,406	11,420	24,828	4,898,340	
	Stream (Chemical)	704	173		877	2,326	297,128	68,371
	Stream (Slash)	68		40	108	1,025	54,000	
	Stream (Machine)	75	15		90	680	42,500	
	All Stream	7,908	2,219	1,406	11,533	28,859	5,291,968	
	All Types	120,708	6,263	1,850	128,821	92,892	16,805,103	

TABLE NO. 8A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Ribes	Gallons Spray
Kootenai	Open Reproduction	9,552	7,262	924,592		.76	97	
	Dense Reproduction	2,952	1,356	151,725		.46	51	
	Open Pole	15,219	6,992	795,874		.46	52	
	Dense Pole	3,665	231	15,607		.06	4	
	Open Mature	7,819	3,081	433,339		.39	55	
	Dense Mature	8,608	458	48,580		.05	6	
	Brush	235	94	7,956		.40	34	
	Burn	115	1	32		.01	1	
	Meadow-Field	103	1			.01		
	All Upland	48,268	19,476	2,377,705		.40	49	
	Stream (Hand)	3,050	8,177	1,214,159		2.58	398	
	All Types	51,318	27,653	3,591,864		.54	70	
Cabinet	Open Reproduction	23,816	23,140	4,833,200		.97	203	
	Dense Reproduction	1,612	438	71,747		.27	45	
	Open Pole	19,283	8,003	1,485,438		.42	77	
	Dense Pole	2,619	901	208,827		.34	80	
	Open Mature	8,740	4,359	1,055,762		.50	121	
	Dense Mature	557	88	8,566		.16	15	
	Brush	2,763	1,895	573,939		.69	208	
	Meadow-Field	348	150	12,131		.43	35	
	All Upland	59,738	38,974	8,249,610		.65	138	
	Stream (Hand)	3,672	10,581	2,804,568		2.88	764	
	Stream (Chemical)	465	1,180	77,079	25,693	2.54	166	55
	Stream (Slash)	23	215	11,500		9.35	500	
	Stream (Machine)	75	644	39,500		8.59	527	
	All Stream	3,770	12,620	2,932,647		3.35	778	
	All Types	63,508	51,594	11,182,257		.81	176	
Savenac Nursery	Open Reproduction	4,692	717	332,932		.15	71	
	Dense Reproduction	102	3			.03		
	All Upland	4,794	720	332,932		.15	69	
	Stream (Hand)	1,088	1,710	372,268		1.57	342	
	Stream (Chemical)	239	777	188,401	32,132	3.25	788	134
	Stream (Slash)	45	168	22,500		3.73	500	
	All Stream	1,088	2,655	583,169		2.44	536	
	All Types	5,882	3,375	916,101		.57	156	
All Forests	Open Reproduction	38,060	31,119	6,090,724		.82	160	
	Dense Reproduction	4,666	1,797	223,472		.39	48	
	Open Pole	34,502	14,995	2,281,312		.43	66	
	Dense Pole	6,284	1,132	224,434		.18	36	
	Open Mature	16,559	7,440	1,489,101		.45	90	
	Dense Mature	9,165	546	57,146		.06	6	
	Brush	2,998	1,989	581,895		.66	194	
	Burn	115	1	32		.01	1	
	Meadow-Field	451	151	12,131		.33	27	
	All Upland	112,800	59,170	10,960,247		.52	97	
	Stream (Hand)	7,810	20,468	4,390,995		2.62	562	
	Stream (Chemical)	704	1,957	265,480	57,825	2.78	377	82
	Stream (Slash)	68	383	34,000		5.63	500	
	Stream (Machine)	75	644	39,500		8.59	527	
	All Stream	7,908	23,452	4,729,975		2.97	598	
	All Types	120,708	82,622	15,690,222		.68	130	

TABLE NO. 8B - SECOND WORKING

Kootenai	Open Reproduction	261	164	25,455		.63	98	
	Dense Reproduction	80	1	67		.01	1	
	Open Pole	779	607	40,490		.78	52	
	All Upland	1,120	772	66,012		.69	59	
	Stream (Hand)	533	805	62,875		1.51	118	
	All Types	1,653	1,577	128,887		.95	78	
Cabinet	Open Reproduction	2,157	2,932	355,387		1.36	165	
	Open Pole	438	333	33,208		.76	76	
	Dense Pole	153	61	2,794		.40	18	
	Open Mature	12	15	1,456		1.25	121	
	All Upland	2,760	3,341	392,845		1.21	142	
	Stream (Hand)	709	1,099	87,812		1.55	124	
	Stream (Chemical)	111	266	19,248	6,416	2.40	173	58
	All Stream	709	1,365	107,060		1.93	151	
	All Types	3,469	4,706	499,905		1.36	144	
Savenac Nursery	Open Reproduction	164	181	34,036		1.10	208	
	Stream (Hand)	962	1,009	294,320		1.05	306	
	Stream (Chemical)	62	103	12,400	4,130	1.66	200	67
	Stream (Machine)	15	36	3,000		2.40	200	
	All Stream	977	1,148	309,720		1.18	317	
	All Types	1,141	1,329	343,756		1.16	301	
All Forests	Open Reproduction	2,582	3,277	414,878		1.27	161	
	Dense Reproduction	80	1	67		.01	1	
	Open Pole	1,217	940	73,698		.77	61	
	Dense Pole	153	61	2,794		.40	18	
	Open Mature	12	15	1,456		1.25	121	
	All Upland	4,044	4,294	492,893		1.06	122	
	Stream (Hand)	2,204	2,913	445,007		1.32	202	
	Stream (Chemical)	173	369	31,648	10,546	2.13	183	61
	Stream (Machine)	15	36	3,000		2.40	200	
	All Stream	2,219	3,318	479,655		1.50	216	
	All Types	6,263	7,612	972,548		1.22	155	

TABLE NO. 8C - THIRD WORKING

Cabinet	Open Reproduction	394	470	54,129		1.19	137	
	Open Pole	38	95	5,806		2.50	153	
	Dense Pole	12	4	60		.33	5	
	All Upland	444	569	59,995		1.28	135	
	Stream (Hand)	72	40	5,214		.56	72	
	All Types	516	609	65,209		1.18	126	
Savenac Nursery	Stream (Hand)	1,334	1,407	57,124		1.05	43	
	Stream (Slash)	40	642	20,000		16.05	500	
	All Stream	1,334	2,049	77,124		1.54	58	
All Forests	Open Reproduction	394	470	54,129		1.19	137	
	Open Pole	38	95	5,806		2.50	153	
	Dense Pole	12	4	60		.33	5	
	All Upland	444	569	59,995		1.28	135	
	Stream (Hand)	1,406	1,447	62,338		1.03	44	
	Stream (Slash)	40	642	20,000		16.05	500	
	All Stream	1,406	2,089	82,338		1.49	59	
	All Types	1,850	2,658	142,333		1.44	77	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1940
MONTANA OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man Days	Ribes	Gallons per Sprayed Area
First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334	148
	FS-Reg.	8,656	9,565	1,446,312	2,452	1.11	167	54
	EQ-NIRA	21,773	8,027	2,158,067		.37	99	
	FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211	40
	EQ-ERA	42,313	20,386	3,292,671	1,330	.48	78	44
	FS-ERA	10,710	15,783	2,382,840	10,181	1.47	222	90
	F-CCC	13,658	9,757	1,263,790	2,780	.71	93	59
	Total	120,708	82,622	15,690,222	57,825	.68	130	82
Second	EQ-Reg.	619	980	299,410	4,130	1.58	484	67
	FS-Reg.	1,820	1,491	151,306	5,376	.82	83	59
	EQ-ERA	1,342	1,597	265,637		1.19	198	
	FS-ERA	2,080	2,456	202,732	1,040	1.18	97	52
	F-CCC	402	1,088	53,463		2.71	133	
	Total	6,263	7,612	972,548	10,546	1.22	155	61
Third	FS-Reg.	1,052	1,813	77,224		1.72	73	
	EQ-ERA	648	777	59,040		1.20	91	
	FS-ERA	150	68	6,069		.45	40	
	Total	1,850	2,658	142,333		1.44	77	
All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380	129
	FS-Reg.	11,528	12,869	1,674,842	7,828	1.12	145	58
	EQ-NIRA	21,773	8,027	2,158,067		.37	99	
	FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211	40
	EQ-ERA	44,303	22,760	3,617,348	1,330	.51	82	44
	FS-ERA	12,940	18,307	2,591,641	11,221	1.41	200	84
	F-CCC	14,060	10,845	1,317,253	2,780	.77	94	59
	Total	128,821	92,892	16,805,103	68,371	.72	130	78

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1940
MONTANA OPERATION

Working	Number of Acres Worked by Ownership Classes			Total
	Forest Service	State - Montana	Private	
First	100,006	696	20,006	120,708
Second	4,305		1,958	6,263
Third	774		1,076	1,850
All Workings	105,085	696	23,040	128,821

TABLE NO. 11

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1940
MONTANA OPERATION

Ownership Class	Number of Acres			Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
Forest Service	100,006	49,813	149,819	13,706	163,525
State - Montana	696	234	930		930
Private	20,006	13,789	33,795	2,490	36,285
Total	120,708	63,836	184,544	16,196	200,740

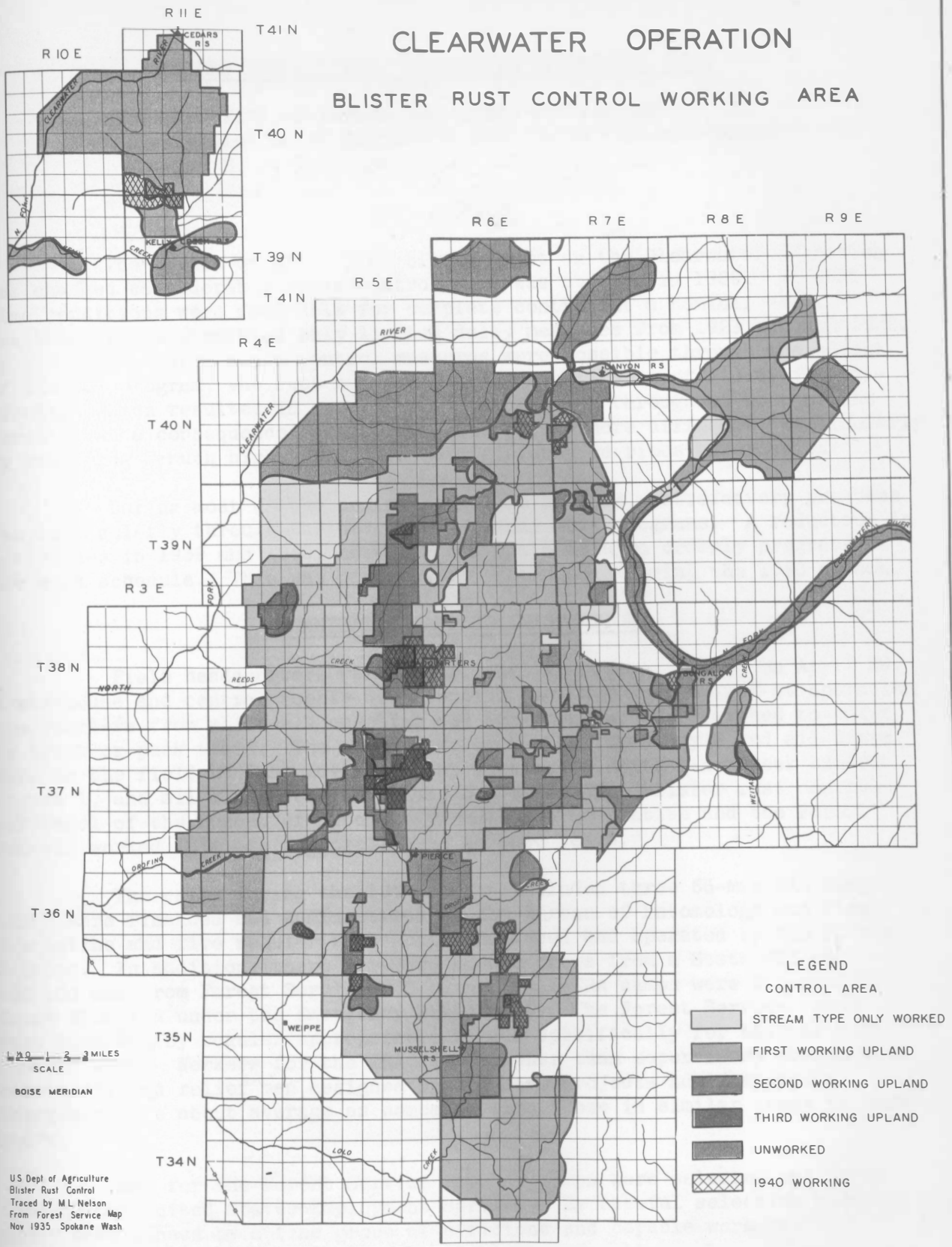
TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1928-1940
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Open Reproduction	38,060	2,803,515	3,110,851	4,714	55,569	113,754	1,176	1,145	6,090,724
	Dense Reproduction	4,666	146,302	73,843			1,048	2,279		223,472
	Open Pole	34,502	1,247,964	864,193	200	93,026	75,929			2,281,312
	Dense Pole	6,284	130,061	77,785		8,179	8,409			224,434
	Open Mature	16,559	1,289,375	172,589	259	11,080	8,729	7,069		1,489,101
	Dense Mature	9,165	52,151	4,807				188		57,146
	Brush	2,998	285,702	285,771		5,260	5,162			581,895
	Burn	115	32							32
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	112,800	5,960,112	4,589,839	5,173	180,235	213,031	10,712	1,145	10,960,247
	Stream	7,908	3,004,551	116,392	266,006	1,284,254	5,744	31,905	21,123	4,729,975
	All Types	120,708	8,964,663	4,706,231	271,179	1,464,489	218,775	42,617	22,268	15,690,222
Second	Open Reproduction	2,582	151,273	240,915	4,860	4,668	10,571		2,591	414,878
	Dense Reproduction	80	63	4						67
	Open Pole	1,217	44,067	22,576		6,134	921			73,698
	Dense Pole	153	801	1,708		285				2,794
	Open Mature	12	1,456							1,456
	All Upland	4,044	197,660	265,203	4,860	11,087	11,492		2,591	492,893
	Stream	2,219	95,926	1,045	41,720	324,083	10,317		6,564	479,555
	All Types	6,263	293,586	266,248	46,580	335,170	21,809		9,155	972,548
Third	Open Reproduction	394	30,594	23,335			200			54,129
	Open Pole	38	800	5,000			6			5,806
	Dense Pole	12		60						60
	All Upland	444	31,394	28,395			206			59,995
	Stream	1,406	7,794	20	13,987	60,537				82,338
	All Types	1,850	39,188	28,415	13,987	60,537	206			142,333
All Workings	Open Reproduction	41,036	2,985,382	3,375,101	9,574	60,237	124,525	1,176	3,736	6,559,731
	Dense Reproduction	4,746	146,365	73,847			1,048	2,279		223,539
	Open Pole	35,757	1,292,831	891,769	200	99,160	76,856			2,360,816
	Dense Pole	6,449	130,862	79,553		8,464	8,409			227,288
	Open Mature	16,571	1,290,831	172,589	259	11,080	8,729	7,069		1,490,557
	Dense Mature	9,165	52,151	4,807				188		57,146
	Brush	2,998	285,702	285,771		5,260	5,162			581,895
	Burn	115	32							32
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	117,288	6,189,166	4,883,437	10,033	191,322	224,729	10,712	3,736	11,513,135
	Stream	11,533	3,108,271	117,457	321,713	1,668,874	16,061	31,905	27,687	5,291,968
	All Types	128,821	9,297,437	5,000,894	331,746	1,860,196	240,790	42,617	31,423	16,805,103

CLEARWATER OPERATION

BLISTER RUST CONTROL WORKING AREA



U.S. Dept of Agriculture
Blister Rust Control
Traced by M.L. Nelson
From Forest Service Map
Nov 1935 Spokane Wash

ANNUAL REPORT 1940
F. J. HEINRICH

RIBES ERADICATION, CLEARWATER OPERATION, 1940

By
F. J. Heinrich, Associate Pathologist
David Kyle, Chief Scientific Aid, U. S. Forest Service
H. J. Faulkner, Chief Scientific Aid

INTRODUCTION

The status of white pine blister rust on the Clearwater operation has changed considerably since control work was started in 1929. At that time conditions were favorable for complete control at a nominal cost. Available funds permitted only limited delay measures from 1929 through 1932. By 1933, when large scale control measures were possible through the advent of the CCC program, the rust had reached its eighth year of steady intensification which resulted in its general distribution throughout most of the forest. As a consequence control problems became more difficult, particularly by requiring a much higher standard of efficiency in ribes eradication.

During most of the period from 1933 to 1938, satisfactory progress was made chiefly through the several emergency work programs. A reduction in activities in 1939 and 1940, however, has again delayed orderly progress on the work schedule. This was particularly noticeable during the 1940 season.

ORGANIZATION AND ADMINISTRATION

Field headquarters were established at Pierce, Idaho, on April 29. A warehouse and central supply distributing base were maintained at operation headquarters from which all supplies and equipment were dispatched to camps by truck or pack train. The first camp was established May 6 and all camps were in the field by June 10. The camp working on White Pine Creek closed August 1, and all camps were closed by September 30. Blister rust control personnel of the Bureau of Entomology and Plant Quarantine and the Forest Service worked in close cooperation as in past years.

The camps during the 1940 season included three 66-man ERA camps which were financed and administered by the Bureau of Entomology and Plant Quarantine and five regular funds camps financed and operated by the Forest Service. In addition, there were two 25-man crews from a State CCC camp and 100 men from Forest Service CCC camps. All ERA camps were financed by funds allotted under the Emergency Relief Act. The Forest Service camps were financed by regular appropriations made specifically for blister rust control work. Workers for the ERA camps, other than supervisory personnel, were certified relief men assigned by the Work Projects Administration. These men were about average as compared with those in similar camps in past years.

Men for the Forest Service regular camps were selected and hired through the United States Employment Service. By careful selection these camps were manned by a fine group of efficient and capable workers.

Due to a very serious and prolonged forest fire condition during the past season, the Forest Service regular camps were frequently called for fire suppression duty. Although fire fighting was necessary, it did cause considerable disorganization and time loss from control work.

LOCATION AND DESCRIPTION OF AREAS

With the large amount of logging on state and private lands, it was necessary for ERA camps to work almost entirely on cutover lands. One camp was located at the mouth of Soucie Creek and worked an area on lower White Pine Creek. This camp was discontinued August 1 due to the shortage of men. The other two camps were located on Trail Creek and Upper Deer Creek.

The abundance of dwarf ribes, which usually follow logging operations, caused considerable difficulty on all three camp areas. The cost of removing them is relatively high, but they usually carry considerable infection. This necessitates careful consideration of each area to secure the maximum effectiveness from the crews.

The Forest Service regular camps were located in Greer Gulch, forks of Lolo Creek, North Fork Musselshell Creek, Swanson Creek and Soucie Creek. These camp areas, without exception, consisted of very difficult working conditions. Most of the area was classed as open reproduction which is associated with Ceanothus sanguineus, Ribes lacustre and R. viscosissimum.

For the first time, control work was carried on in the Moose City Basin. The work was done in the Moose Creek drainage by CCC crews from a spike camp located at the mouth of Moose Creek. Considering the amount of chemical eradication done and the fire demands, this camp made good progress. This area supports an excellent stand of young white pine reproduction. Although there is considerable R. petiolare and localized infection present, early control work in this area could give complete protection at a reasonable cost.

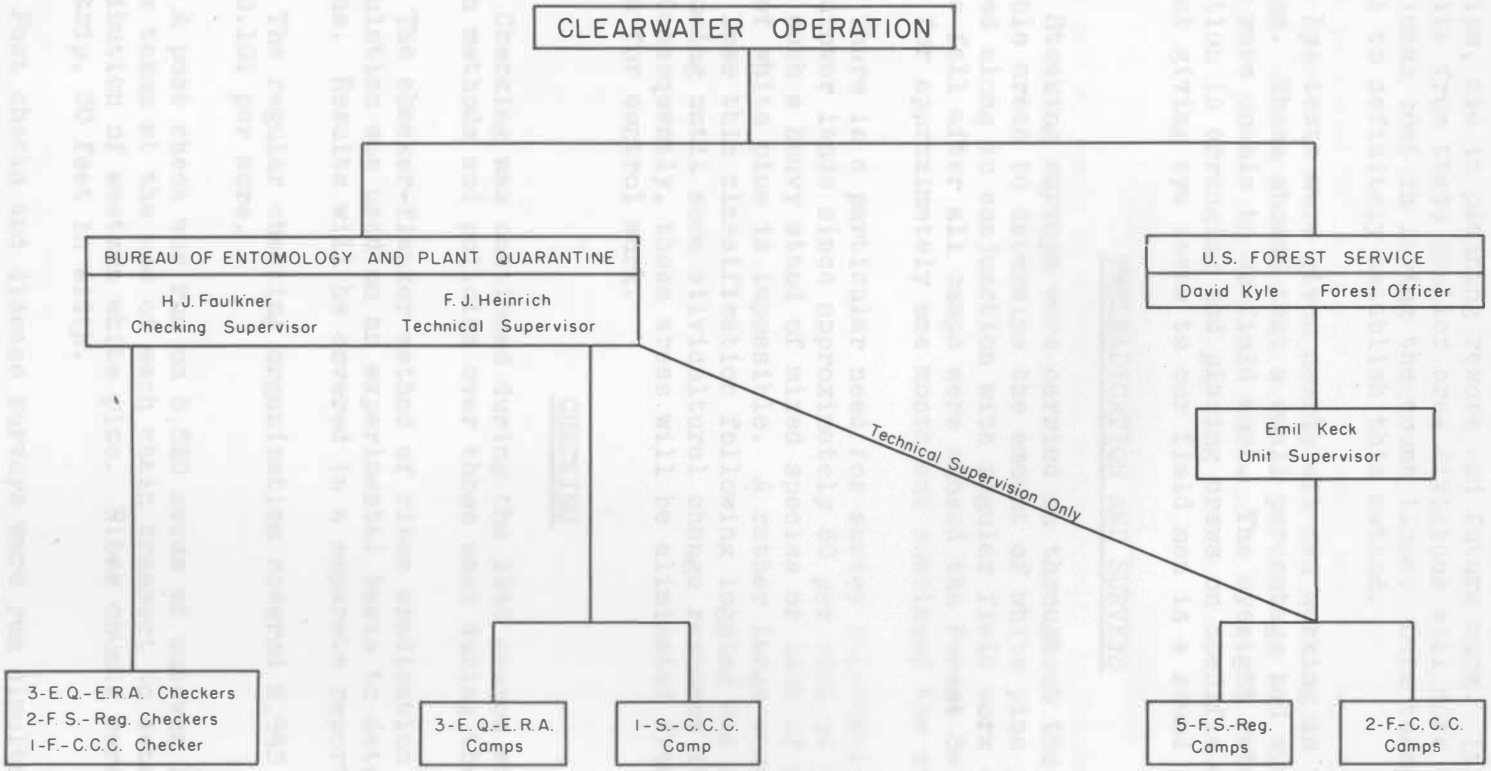
The CCC camp at Bungalow Ranger Station worked an area between the forks of Orogrande Creek and the North Fork of the Clearwater River. The working conditions were very difficult due to the ruggedness of terrain and the density of brush.

The State CCC camp worked area on Heywood Creek, Grasshopper Creek and the Battles burn. The crews covered considerable ground, but the efficiency was relatively low.

METHODS AND EQUIPMENT

Count lines or cross strings at five or ten chain intervals were used in some of the camps in laying out crew work. The primary object of this method is to secure a crew count at frequent intervals in order to record data on a smaller unit of area than the one commonly used of 40 acres or more. The units used were two and one-half and ten acres in size.

ORGANIZATION CHART



E.Q.-E.R.A.
Number of Camps - 3
Number of Men - 297

S.-C.C.C.
Number of Camps - 1
Number of Men - 62

F.S.-REG.
Number of Camps - 5
Number of Men - 166

F.-C.C.C.
Number of Camps - 2
Number of Men - 106

Total Number of Men on Blister Rust Work - 631

1940

Results include the beneficial psychological effect on the men from working short strips, aid in planning rework and future work. It is believed that the benefits from these smaller crew divisions will more than compensate for the additional cost in laying the count lines. Data taken thus far are insufficient to definitely establish this method.

Eye tests were given nearly all men working in the ERA and regular funds camps. These showed that a small percentage had such poor eyesight that they were unable to do field work. The eyesight ratings were taken into consideration in arranging and placing crews on specific areas. It is believed that giving eye tests to our field men is a sound practice.

PREERADICATION AND SURVEYS

Stocking surveys were carried on throughout the summer and fall on questionable areas to determine the amount of white pine present. This work was carried along in conjunction with regular field work during the summer. During the fall after all camps were closed the Forest Service camp bosses were used for approximately one month and continued the surveys.

There is a particular need for survey information in planning the work on cutover lands since approximately 50 per cent of this type is being left with such a heavy stand of mixed species or lack of seed source that a new crop of white pine is impossible. A rather large acreage of white pine type will lose this classification following logging and remain non-white pine producing until some silvicultural change restores it to pine producing status. Consequently, these areas will be eliminated from area under consideration for control work.

CHECKING

Checking was continued during the 1940 season with only minor changes in methods and policies over those used during the 1939 season.

The checker-flanker method of ribes eradication on areas of light ribes population was used on an experimental basis to determine its use and limitations. Results will be covered in a separate report.

The regular checking organization covered 8,863 acres at an average cost of $0.101 per acre.

A post check was run on 5,520 acres of cutover lands. Four milacre plots were taken at the end of each chain transect to determine the amount and distribution of western white pine. Ribes counts were taken on a continuous strip, 30 feet in width.

Post checks and disease surveys were run simultaneously on areas where both were needed. Checkers worked in conjunction with disease survey men, searching for ribes and aiding in classifying and recording ribes and canker data. The combining of these two surveys resulted in securing better

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
CLEARWATER OPERATION

Program	Number Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
EQ-ERA	10,469	EQ-ERA	$ 62,858.82	$6.46
		EQ-Reg.	4,775.95	
		Total	67,634.77	
FS-Reg.	8,228	FS-Reg.	62,030.39	7.71
		FS-ERA	347.00	
		EQ-Reg.	1,080.00	
		Total	63,457.39	
CCC	3,407	FS-Reg.	3,116.72	CCC Funds Not Included
		FS-ERA	346.00	
		EQ-Reg.	930.00	
		Total	4,392.72	
Pine Disease Survey		FS-Reg.	1,213.35	
Total Cost 1940 Program			$136,698.23	

	Forest Service	Bureau
Number of meals served	72,495	70,255
Average cost per meal	$.178	$.168
Pounds of chemical used	4,410	2,247
Pounds of twine used	2,117	2,689

SUMMARY OF RIBES ERADICATION, 1940
CLEARWATER OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Open Reproduction	1,098	4,097	777	5,972	10,225	1,027,471		7.0	19.8
Open Pole	236			236				0	0
Cutover		4,374	3,481	7,855	10,316	3,020,389		13.6	26.2
Burn		192		192	353	323,918		50.0	64.4
All Upland	1,334	8,663	4,258	14,255	20,894	4,371,778		10.7	23.4
Stream (Hand)	229	41		270	674	94,672		7.0	45.5
Stream (Chemical)	194	3	110	307	536	19,710	6,570	0	0
All Stream	229	41		270	1,210	114,382		7.0	45.5
All Types	1,563	8,704	4,258	14,525	22,104	4,486,160		10.5	25.1

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	1,098	2,718	285,551		2.48	260		11.1	38.9
Open Pole	236							0	0
All Upland	1,334	2,718	285,551		2.04	214			
Stream (Hand)	229	575	76,389		2.51	334			
Stream (Chemical)	194	402	13,230	4,410	2.07	68	23	5.4	39.9
All Stream	229	977	89,619		4.27	391		5.4	39.9
All Types	1,563	3,695	375,170		2.36	240		6.8	36.4
TABLE NO. 3B - SECOND WORKING									
Open Reproduction	4,097	7,102	674,502		1.73	165		5.3	12.7
Cutover	4,374	5,705	2,372,004		1.30	542		15.5	27.5
Burn	192	353	323,918		1.84	1,687		50.0	64.4
All Upland	8,663	13,160	3,370,424		1.52	389		10.8	20.7
Stream (Hand)	41	99	18,283		2.41	446		0	0
Stream (Chemical)	3	3	150	50	1.00	50	17	0	0
All Stream	41	102	18,433		2.49	450		0	0
All Types	8,704	13,262	3,388,857		1.52	389		10.8	20.7
TABLE NO. 3C - THIRD WORKING									
Open Reproduction	777	405	67,418		.52	87		9.8	30.9
Cutover	3,481	4,611	648,385		1.32	186		10.3	23.9
All Upland	4,258	5,016	715,803		1.18	168			
Stream (Chemical)	110	131	6,330	2,110	1.19	58	19	31.9	133.8
All Types	4,258	5,147	722,133		1.21	170		11.2	29.2

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
CLEARWATER OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	428	1,416	171,470		3.31	401		18.9	66.3
	F-CCC	1,135	2,279	203,700	4,410	2.01	179	23	4.0	29.3
	Total	1,563	3,695	375,170	4,410	2.36	240			
Second	EQ-ERA	4,391	6,285	2,602,563	50	1.43	593	17	16.7	30.4
	FS-Reg.	3,893	6,604	776,846		1.70	200		3.5	8.7
	S-CCC	420	373	9,448		.89	22			
	Total	8,704	13,262	3,388,857	50	1.52	389			
Third	EQ-ERA	3,498	4,184	539,750	2,110	1.20	154	19	11.4	30.7
	FS-Reg.	280	208	33,010		.74	118		2.7	5.3
	S-CCC	480	755	149,373		1.57	311			
	Total	4,258	5,147	722,133	2,110	1.21	170			
All Workings	EQ-ERA	7,889	10,469	3,142,313	2,160	1.33	398	19	14.4	30.5
	FS-Reg.	4,601	8,228	981,226		1.79	213		4.7	13.1
	F-CCC	1,135	2,279	203,700	4,410	2.01	179	23	5.4	28.0
	S-CCC	900	1,128	158,821		1.25	176			
	Total	14,525	22,104	4,486,160	6,570	1.52	309		10.5	25.1

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
CLEARWATER OPERATION

State	Working	Number of Acres Worked								
		By Forest Service		By Bureau of Entomology and Plant Quarantine			Total			
		Federal Forest Service	Private	Forest Service	State	Private	Federal Forest Service	State	Private	Total
Idaho	First	1,563					1,563			1,563
	Second	3,818	75		1,395	3,416	3,818	1,395	3,491	8,704
	Third	280		255	523	3,200	535	523	3,200	4,258
	Total	5,661	75	255	1,918	6,616	5,916	1,918	6,691	14,525

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
CLEARWATER OPERATION

Eradication Type	Average Results for All Areas				Areas With More Than 25 Feet Live Stem Per Acre		
	Acres in Checked Area	Acres Checked	Ribes Per Acre			Ribes Per Acre	
			Bushes	Live Stem	Acres	Bushes	Live Stem
Open Reproduction	4,040	152.8	7.0	19.8	627	24.0	76.5
Open Pole	84	3.3	0	0		0	0
Cutover	4,471	162.5	13.6	26.2	1,622	26.8	48.9
Brush	42	1.6	55.0	76.3	42	55.0	76.3
Burn	70	1.6	50.0	64.4	70	50.0	64.4
All Upland	8,707	321.8	10.7	23.4	2,361	27.1	57.6
Stream	156	26.6	7.0	45.5	156	7.0	45.5
All Types	8,863	348.4	10.5	25.1	2,517	21.8	54.4

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Open Reproduction	1,098	93,010	192,541				285,551
	Open Pole	236						
	All Upland	1,334	93,010	192,541				285,551
	Stream	229	76,389		13,230			89,619
	All Types	1,563	169,399	192,541	13,230			375,170
Second	Open Reproduction	4,097	57,033	612,751	4,682		36	674,502
	Cutover	4,374	116,515	2,235,056	19,732	616	85	2,372,004
	Burn	192	3,089	320,829				323,918
	All Upland	8,663	176,637	3,168,636	24,414	616	121	3,370,424
	Stream	41	9,389	2,074	6,970			18,433
	All Types	8,704	186,026	3,170,710	31,384	616	121	3,388,857
Third	Open Reproduction	777	3,603	63,620	195			67,418
	Cutover	3,481	70,507	565,604	12,131		143	648,385
	All Upland	4,258	74,110	629,224	12,326		143	715,803
	Stream	110			6,330			6,330
	All Types	4,258	74,110	629,224	18,656		143	722,133
All Workings	Open Reproduction	5,972	153,646	868,912	4,877		36	1,027,471
	Open Pole	236						
	Cutover	7,855	187,022	2,800,660	31,863	616	228	3,020,389
	Burn	192	3,089	320,829				323,918
	All Upland	14,255	343,757	3,990,401	36,740	616	264	4,371,778
	Stream	270	85,778	2,074	26,530			114,382
	All Types	14,525	429,535	3,992,475	63,270	616	264	4,486,160

SUMMARY OF RIBES ERADICATION, 1929-1940
CLEARWATER OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Open Reproduction	58,371	16,484	1,717	76,572	123,566	34,699,898	
Dense Reproduction	11,088	493		11,581	5,286	1,164,891	
Open Pole	25,677	11,284		36,961	21,382	4,527,630	
Dense Pole	3,534	1,569		5,103	1,553	292,973	
Open Mature	213,980	15,743		229,723	107,122	24,099,942	
Dense Mature	5,309	324		5,633	559	134,244	
Cutover	27,726	29,805	4,779	62,310	61,987	20,809,011	
Brush	2,795	79		2,874	2,578	732,633	
Burn	1,045	432		1,477	1,777	1,285,330	
Subalpine	122			122	118	53,948	
Meadow-Field	1,890			1,890			
All Upland	351,537	76,213	6,496	434,246	325,928	87,800,500	
Stream (Hand)	41,606	21,727	2,174	65,507	62,639	14,002,260	
Stream (Chemical)	14,430	5,510	498	20,438	38,062	2,655,621	885,007
Stream (Slash)	65	13		78	1,258	188,983	
Stream (Zone)		1,666		1,666	1,129	280,094	
All Stream	41,671	23,406	2,174	67,251	103,088	17,126,958	
All Types	393,208	99,619	8,670	501,497	429,016	104,927,458	

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Ribes	Gallons Spray
Open Reproduction	58,371	98,897	31,935,573		1.69	547	
Dense Reproduction	11,088	5,214	1,161,593		.47	105	
Open Pole	25,677	15,201	3,600,567		.59	140	
Dense Pole	3,534	937	185,062		.27	52	
Open Mature	213,980	99,387	23,291,483		.46	109	
Dense Mature	5,309	493	130,871		.09	25	
Cutover	27,726	25,888	10,610,089		.93	383	
Brush	2,795	2,536	729,247		.91	261	
Burn	1,045	1,246	917,609		1.19	878	
Subalpine	122	118	53,948		.97	442	
Meadow-Field	1,890						
All Upland	351,537	249,917	72,616,042		.71	207	
Stream (Hand)	41,606	43,841	11,105,816		1.05	267	
Stream (Chemical)	14,430	30,055	2,300,855	766,685	2.08	159	53
Stream (Slash)	65	1,233	188,983		18.96	2,907	
All Stream	41,671	75,129	13,595,654		1.80	326	
All Types	393,208	325,046	86,211,696		.83	219	

TABLE NO. 8B - SECOND WORKING

Open Reproduction	16,484	22,508	2,558,176		1.37	155	
Dense Reproduction	493	72	3,298		.15	7	
Open Pole	11,284	6,181	927,063		.55	82	
Dense Pole	1,569	616	107,911		.39	69	
Open Mature	15,743	7,735	808,459		.49	51	
Dense Mature	324	66	3,373		.20	10	
Cutover	29,805	30,610	9,507,715		1.03	319	
Brush	79	42	3,386		.53	43	
Burn	432	531	367,721		1.23	851	
All Upland	76,213	68,361	14,287,102		.90	187	
Stream (Hand)	21,727	17,194	2,661,081		.79	122	
Stream (Chemical)	5,510	7,653	340,093	113,431	1.39	62	21
Stream (Slash)	13	25			1.92		
Stream (Zone)	1,666	1,129	280,094		.68	168	
All Stream	23,406	26,001	3,281,268		1.11	140	
All Types	99,619	94,362	17,568,370		.95	176	

TABLE NO. 8C - THIRD WORKING

Open Reproduction	1,717	2,161	206,149		1.26	120	
Cutover	4,779	5,489	691,207		1.15	145	
All Upland	6,496	7,650	897,356		1.18	138	
Stream (Hand)	2,174	1,604	235,363		.74	108	
Stream (Chemical)	498	354	14,673	4,891	.71	29	10
All Stream	2,174	1,958	250,036		.90	115	
All Types	8,670	9,608	1,147,392		1.11	132	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1940
CLEARWATER OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis: Man Days	Ribes	Gallons Per Sprayed Area
First	FS-Reg.	11,303	17,065	6,328,090	18,060	1.51	560	72
	EQ-NIRA	19,009	12,345	5,679,694	13,361	.65	299	69
	FS-NIRA	41,460	33,021	12,605,276	11,694	.80	304	79
	EQ-ERA	62,640	60,861	14,881,129	75,622	.97	238	77
	FS-ERA	2,503	3,769	1,427,903		1.51	570	
	Cooperative	91,453	59,665	18,267,124	283,158	.65	200	36
	F-CCC	66,494	61,846	12,935,834	153,039	.93	195	59
	S&P-CCC	98,346	76,474	14,086,646	211,751	.78	143	87
	Total	393,208	325,046	86,211,696	766,685	.83	219	53
Second	FS-Reg.	17,559	15,491	2,435,601	6,936	.88	139	26
	EQ-NIRA	1,076	660	159,890	3,355	.61	149	45
	FS-NIRA	2,498	2,342	175,212	8,007	.94	70	21
	EQ-ERA	45,521	44,401	8,942,015	42,399	.98	196	28
	FS-ERA	8,249	5,184	514,730	2,044	.63	62	27
	Cooperative	4,843	2,898	553,110	10,553	.60	113	3
	F-CCC	10,415	12,155	1,476,068	18,003	1.17	142	41
	S&P-CCC	9,458	11,231	3,311,744	22,134	1.19	350	19
	Total	99,619	94,362	17,568,370	113,431	.95	176	15
Third	FS-Reg.	726	556	64,553		.77	89	
	FS-NIRA	914	747	127,700	1,922	.82	140	30
	EQ-ERA	5,286	6,353	673,159	2,110	1.20	127	19
	FS-ERA	284	319	44,201	348	1.12	156	3
	F-CCC	683	778	73,959	511	1.14	108	2
	S&P-CCC	777	855	163,820		1.10	211	
	Total	8,670	9,608	1,147,392	4,891	1.11	132	9
All Workings	FS-Reg.	29,588	33,112	8,828,244	24,996	1.12	298	49
	EQ-NIRA	20,085	13,005	5,839,584	16,716	.65	291	62
	FS-NIRA	44,872	36,110	12,908,188	21,623	.80	288	36
	EQ-ERA	113,447	111,615	24,496,303	120,131	.98	216	46
	FS-ERA	11,036	9,272	1,986,834	2,392	.84	180	13
	Cooperative	96,296	62,563	18,820,234	293,711	.65	195	26
	F-CCC	77,592	74,779	14,485,861	171,553	.96	187	53
	S&P-CCC	108,581	88,560	17,562,210	233,885	.82	162	66
	Total	501,497	429,016	104,927,458	885,007	.86	209	40

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1940
CLEARWATER OPERATION

Working	Number of Acres Worked by Ownership Classes: Federal: Forest Service	Federal: Public Domain	Federal: Total	State - Idaho	Private	Total
First	148,094	3,680	151,774	78,834	162,600	393,208
Second	44,200	628	44,828	14,618	40,173	99,619
Third	2,773	12	2,785	883	5,002	8,670
All Workings	195,067	4,320	199,387	94,335	207,775	501,497

TABLE NO. 11

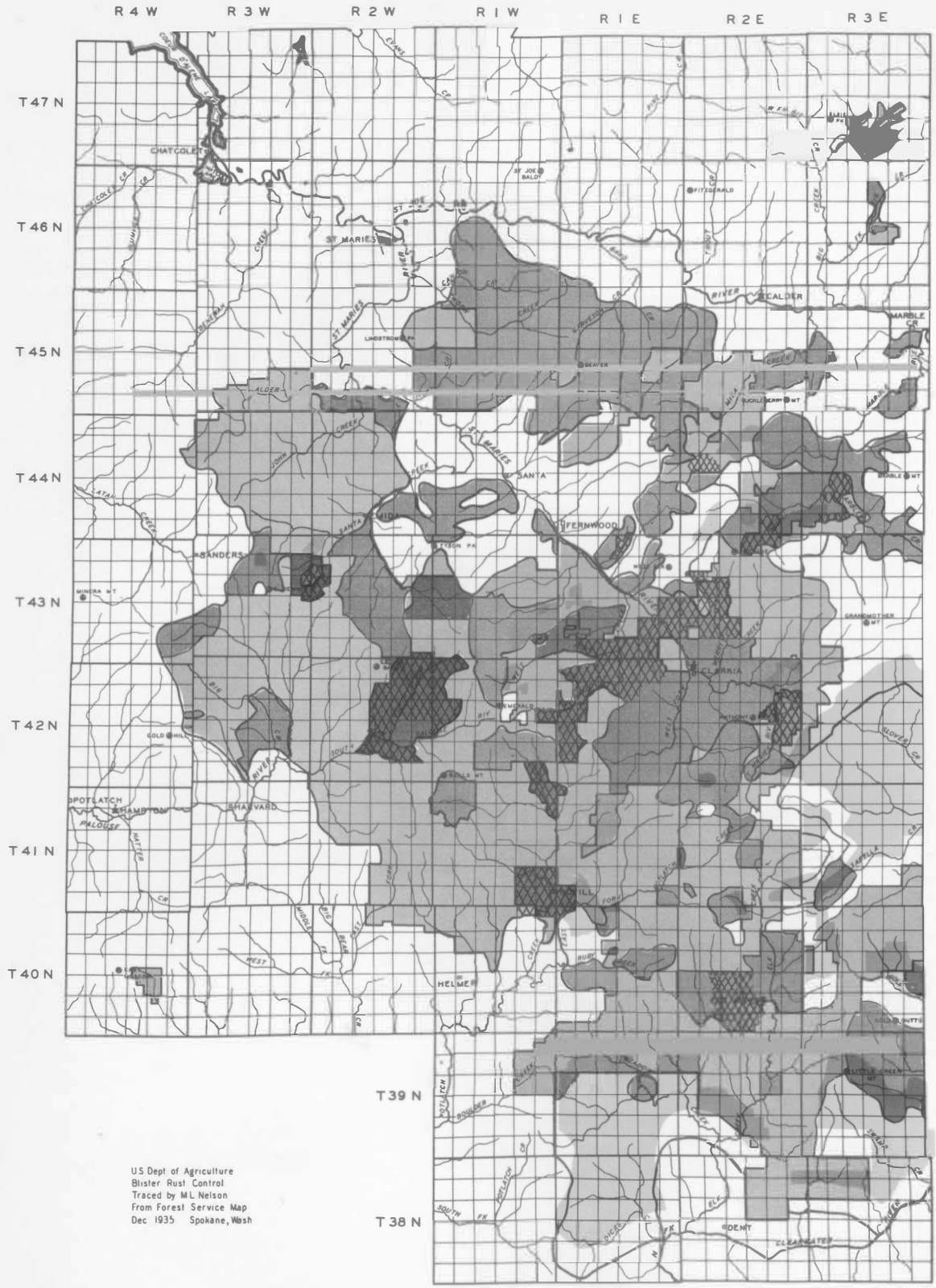
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1940
CLEARWATER OPERATION

Ownership Class	Number of Acres: Worked	Unworked	Total	Acres Mature Stands on Which Working is Deferred	Total Acres White Pine
Forest Service	148,094	47,776	195,870	8,360	204,730
Public Domain	3,680	350	4,030		4,030
Subtotal Federal	151,774	48,126	199,900	8,860	208,760
State	78,834	2,956	81,790	11,200	92,990
Private	162,600	17,710	180,310	27,940	208,250
Total	393,208	68,792	462,000	48,000	510,000

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1929-1940
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Open Reproduction	58,371	7,571,888	24,133,032	73,506	41,600	115,547		31,935,573
	Dense Reproduction	11,088	157,346	980,480	2,457	5,726	15,584		1,161,593
	Open Pole	25,677	2,340,591	1,221,117	31,301	6	7,090	462	3,600,567
	Dense Pole	3,534	127,043	57,703	316				185,062
	Open Mature	213,980	16,156,577	6,773,065	197,117	107,057	57,641	26	23,291,483
	Dense Mature	5,309	104,873	22,438	715	865	1,980		130,871
	Cutover	27,726	2,100,601	8,431,923	38,603	27,752	11,210		10,610,089
	Brush	2,795	210,516	490,931	17,270	114	10,416		729,247
	Burn	1,045	74,796	838,377	568		3,868		917,609
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	351,537	28,897,731	42,949,514	361,853	183,120	223,336	488	72,616,042
	Stream	41,671	9,861,025	324,255	2,683,146	701,834	25,394		13,595,654
	All Types	393,208	38,758,756	43,273,769	3,044,999	884,954	248,730	488	86,211,696
Second	Open Reproduction	16,484	503,183	2,043,852	11,101	4	36		2,558,176
	Dense Reproduction	493	102	3,192	4				3,298
	Open Pole	11,284	395,523	518,636	12,653	1	250		927,063
	Dense Pole	1,569	101,801	2,734	3,376				107,911
	Open Mature	15,743	392,150	400,158	15,768	116		267	808,459
	Dense Mature	324	3,058	315					3,373
	Cutover	29,805	1,087,641	8,345,143	66,732	724	7,475		9,507,715
	Brush	79	424	2,962					3,386
	Burn	432	19,437	342,837	5,447				367,721
	All Upland	76,213	2,503,319	11,659,829	115,081	845	7,761	267	14,287,102
	Stream	23,406	1,865,403	516,470	806,862	76,716	9,141	6,676	3,281,268
	All Types	99,619	4,368,722	12,176,299	921,943	77,561	16,902	6,943	17,568,370
Third	Open Reproduction	1,717	111,033	93,238	1,878				206,149
	Cutover	4,779	91,007	585,922	14,135		143		691,207
	All Upland	6,496	202,040	679,160	16,013		143		897,356
	Stream	2,174	178,214	2,038	46,968	22,816			250,036
	All Types	8,670	380,254	681,198	62,981	22,816	143		1,147,392
All Workings	Open Reproduction	76,572	8,186,104	26,270,122	86,485	41,604	115,583		34,699,898
	Dense Reproduction	11,581	157,448	983,672	2,461	5,726	15,584		1,164,891
	Open Pole	36,961	2,736,114	1,739,753	43,954	7	7,340	462	4,527,630
	Dense Pole	5,103	228,844	60,437	3,692				292,973
	Open Mature	229,723	16,548,727	7,173,223	212,885	107,173	57,641	293	24,099,942
	Dense Mature	5,633	107,931	22,753	715	865	1,980		134,244
	Cutover	62,310	3,279,249	17,362,988	119,470	28,476	18,828		20,809,011
	Brush	2,874	210,940	493,893	17,270	114	10,416		732,633
	Burn	1,477	94,233	1,181,214	6,015		3,868		1,285,330
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	434,246	31,603,090	55,288,503	492,947	183,965	231,240	755	87,800,500
	Stream	67,251	11,904,642	842,763	3,536,976	801,366	34,535	6,676	17,126,958
	All Types	501,497	43,507,732	56,131,266	4,029,923	985,331	265,775	7,431	104,927,458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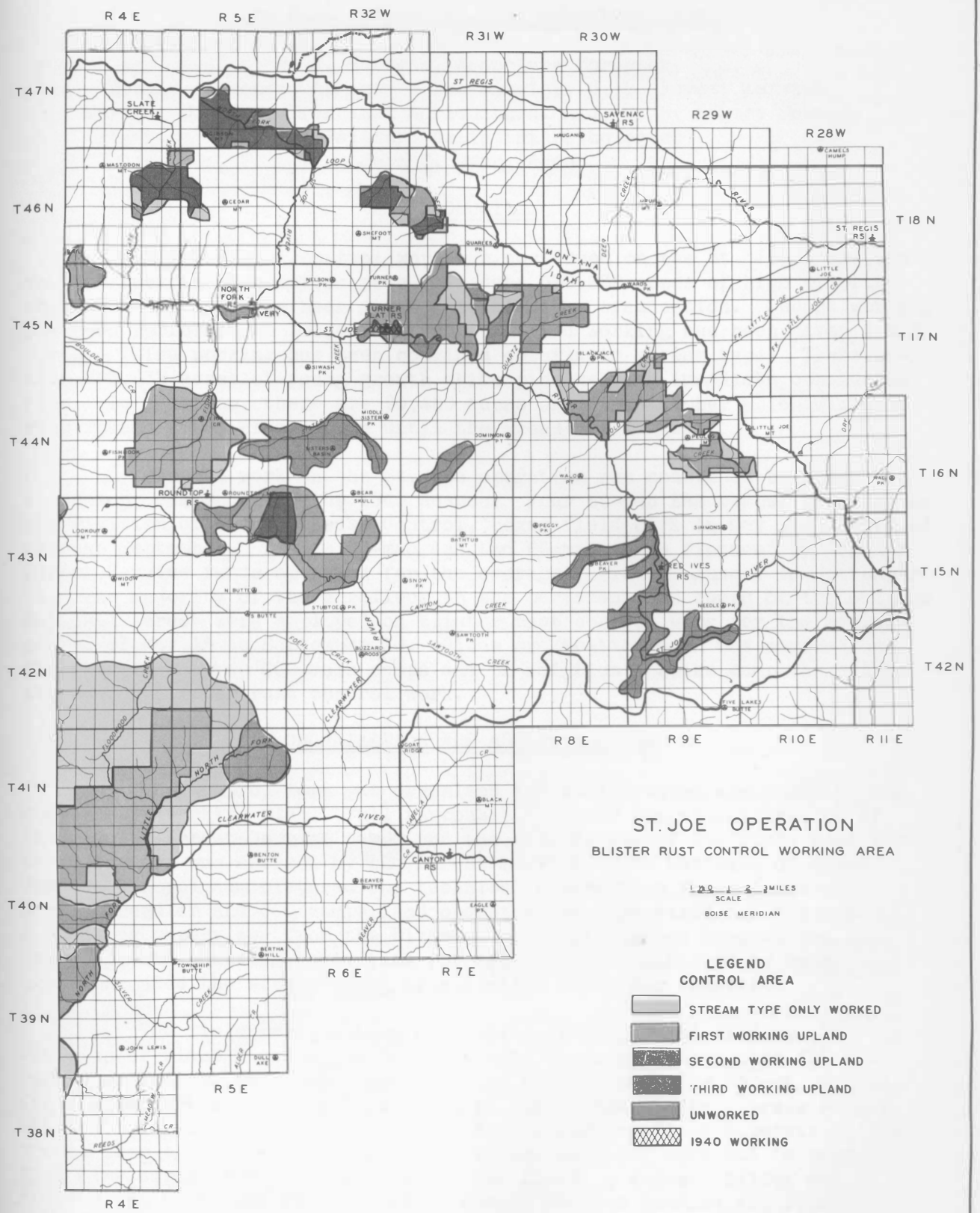
U.S Dept of Agriculture
Blister Rust Control
Traced by M.L Nelson
From Forest Service Map
Dec 1935 Spokane, Wash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ST. JOE OPERATION
BLISTER RUST CONTROL WORKING AREA
SCALE
BOISE MERIDIAN
LEGEND
CONTROL AREA
STREAM TYPE ONLY WORKED
FIRST WORKING UPLAND
SECOND WORKING UPLAND
THIRD WORKING UPLAND
UNWORKED
1940 WORKING

RIBES ERADICATION, ST. JOE OPERATION, 1940

By
H. J. Hartman, Associate Forester
Donald J. Moore, Assistant Pathologist, U. S. Forest Service
Merrill D. Oaks, Principal Agricultural Aid, U. S. Forest Service
W. F. Painter, Assistant Pathologist
John C. Gynn, Agent

INTRODUCTION

Blister rust control work was continued on the St. Joe operation for the twelfth consecutive year. To date 530,832 acres of high priority white pine stands have been given initial ribes eradication. Second working has been performed on 105,475 acres, and third working has been given 9,616 acres. Third working has been confined chiefly to stream type. There remain 263,633 acres of young growth white pine needing immediate consideration. In addition, there are 90,460 acres of mature timber which will not require any ribes eradication until the areas are logged.

Control work on the St. Joe operation was continued by three classes of camps during the 1940 season. Four 66-man ERA camps, financed by the Division of Plant Disease Control, began field work in May and continued through September. Twelve 33-man and two 66-man camps financed by regular Forest Service funds operated for the average period of June 1 to September 15. The majority of the enrollees in the permanent CCC camps on the St. Joe National Forest were employed on blister rust control work for the average period of May 15 to September 30. Ribes eradication work was carried on directly from three CCC main camps and in addition a spike camp was established for blister rust control work.

ORGANIZATION AND ADMINISTRATION

The control work was organized and administered according to the cooperative working plan. Full responsibility for the administration of the regular Forest Service camps and the supervision of the field work for the CCC camps was assumed by the Forest Service. The Division of Plant Disease Control administered the technical supervision for all Forest Service regular and CCC camps, and operated and supervised all ERA camps. A checking supervisor from the Division of Plant Disease Control was in charge of the checking activities for all camps administered by both agencies. See the accompanying organization chart for details.

The field headquarters at Clarkia, Idaho, maintained by the Division of Plant Disease Control, was used as an operating base for all Bureau activities and some Forest Service activities. The Forest Service field headquarters and supply base were maintained at the Clarkia Ranger Station, Clarkia, Idaho. To free the Forest Service field supervisory personnel from the constantly increasing volume of paper work and to permit full time supervision of the crews in the field, a Forest Officer and a field clerk stationed at the Clarkia Ranger Station handled all routine paper work pertaining to reports, records, appointments and employment. This arrangement proved very satisfactory for a large scale operation.

The CCC spike camp was operated on the same basis as in 1939. Subsistence was furnished by the Forest Service and the supervisory cook in the camp was paid from Forest Service funds. The Army refunded to the Forest Service the amount equal to the CCC ration allowance for payment of subsistence.

The only men employed in the ERA camps were those assigned by the Idaho Division of Employment, Work Projects Administration.

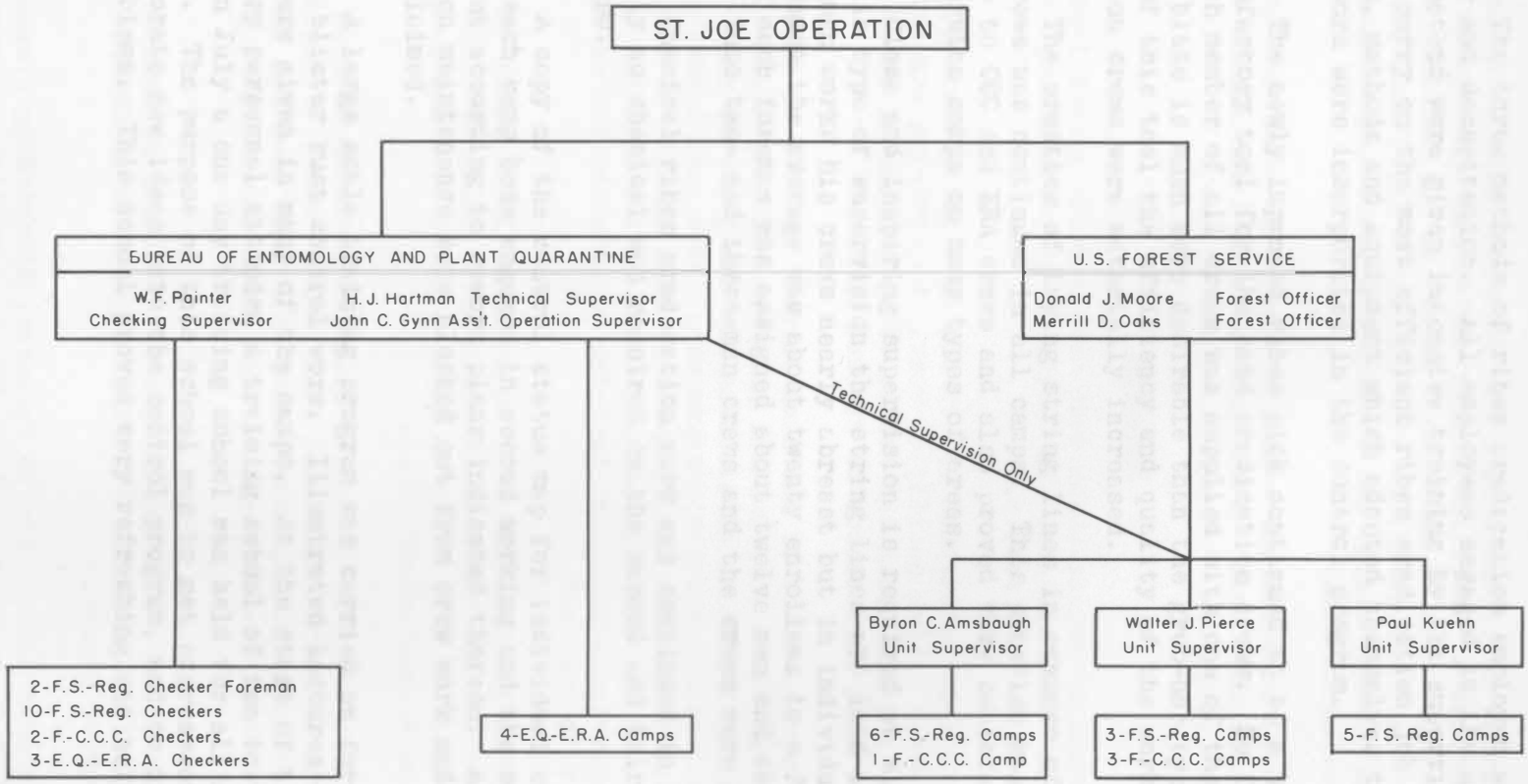
To provide and maintain the best available class of labor in the Forest Service regular camps, all former employees whose services were satisfactory during the past three years were sent application forms. Applicants available from this group were selected by name either directly or through the State Employment Service. Inexperienced men were obtained from applicants interviewed by responsible members of the operation or from local communities through a designated member of each community. About fifty forestry students were employed. This employment policy proved to be very satisfactory for the first half of the season and made available throughout the season a better class of labor than was employed in 1939. As the 1940 season progressed, the labor turnover increased and the quality of available labor greatly decreased. Many outstanding crew leaders and laborers were transferred to ranger districts of the St. Joe National Forest for fire guard and lookout duty. These men were replaced in the blister rust control camps with unsatisfactory inexperienced labor. This practice caused a reduction in the quality and quantity of work and lowered the morale of the camp bosses. Material for crew leaders and for future supervisory positions was noticeably lacking. The labor turnover, amounting to more than 100 per cent, caused a great amount of added expense and lost motion.

During July, August and early September many blister rust camps were engaged in fire suppression work. Blister rust control personnel forms a very valuable first line of defense in fire suppression work.

LOCATION AND DESCRIPTION OF AREAS

The blister rust control policy called for the concentration of all efforts on high priority white pine reproduction stands. First consideration was given to areas needing second working immediately. The remaining camps were placed on first working in young stands. Of the total upland area worked 92 per cent was in pole and reproduction stands. The camps were chiefly confined to the St. Maries, Palouse and Potlatch River drainages. The principal factors taken into consideration to determine the priority of areas were degree of stocking, site, age of stand, amount of infection present, ribes distribution and geographic location. The majority of all areas covered by first and second workings were on comparatively newly disturbed or denuded areas where young white pine had recently become established and represented conditions favorable to the appearance and persistence of ribes. See the accompanying progress map for location of areas worked in 1940.

ORGANIZATION CHART



E.Q.-E.R.A.
Number of Camps - 4
Number of Men - 250

F.-C.C.C.
Number of Camps - 4
Number of Men - 520

F.S.-REG.
Number of Camps - 14
Number of Men - 535

Total Number of Men on Blister Rust Work - 1305

1940

METHODS AND EQUIPMENT

The three methods of ribes eradication employed were hand, chemical-spray and decapitation. All employees engaged in the actual application of each method were given intensive training by the supervisory personnel in order to carry on the most efficient ribes eradication job possible. All new ideas, methods and equipment which adapted themselves to more efficient control work were incorporated in the control program.

The newly improved ribes pick continued to be a very desirable and satisfactory tool for the hand eradication crews. So far as was possible each member of all crews was supplied with one of these picks. The axe-type blade is much more desirable than the grub-hoe type blade. Through the use of this tool the efficiency and quality of the work of the hand eradication crews were materially increased.

The practice of laying string lines in advance of the hand eradication crews was continued in all camps. This practice was particularly adaptable to CCC and ERA crews and also proved very satisfactory in regular Forest Service camps on many types of areas.

Close and inspiring supervision is required at all times, and to secure this type of supervision the string lines are laid in advance and each foreman works his crews nearly abreast but in individual crews. In the CCC camps the average was about twenty enrollees to a foreman. In the ERA camps each foreman was assigned about twelve men and these men were in turn made into two- and three-man crews and the crews were worked abreast.

Chemical ribes eradication work was continued in the usual manner. Practically no chemical was required on the second and third working of stream type.

A copy of the control status map for individual camp areas was supplied each camp boss engaged in second working and the control work was carried out according to rework plans indicated thereon. Areas classified as being on maintenance were blocked out from crew work and the acreage was not claimed.

A large scale training program was carried on for all men employed on blister rust control work. Illustrated lectures on blister rust control were given in many of the camps. At the start of the season all supervisory personnel attended a training school of two to three days' duration. In July a one day training school was held for all supervisory personnel. The purpose of this school was to get expressions of new ideas, to incorporate new ideas into the control program, and to discuss present field problems. This school proved very refreshing and helpful.

PREERADICATION

Throughout the field season the permanent personnel continued making field inspections of areas previously worked and areas to be worked in the future. A close watch is maintained on all of the control area with regard to the presence and amount of pine and ribes infection; ribes and pine regeneration and growth; amount and nature of disturbances caused by fire, logging and clearing of lands.

A natural reproduction stocking survey was conducted on 6,400 acres of newly disturbed area. These data were used in blister rust control and silvicultural planning.

CHECKING

The checking organization made very careful inspections of worked areas for the 1940 field season. In addition, inspections were made of a number of areas previously worked.

The checkers throughout the season were given close supervision in order to maintain a high quality of work. Supervision was accomplished by observing the checker along the strip, the rerunning of original check strips and the random inspections of checked areas.

The responsibility of checking current as well as previously worked areas necessitates very careful selection of personnel. Individuals with an outstanding record on eradication for two years or more are considered as best adapted for checker assignments. When such individuals are given the necessary checking training a very high quality of work results. At the beginning of the field season all checkers are required to pull ribes for at least ten days. Such training affords the men an opportunity to develop their "ribes-eye".

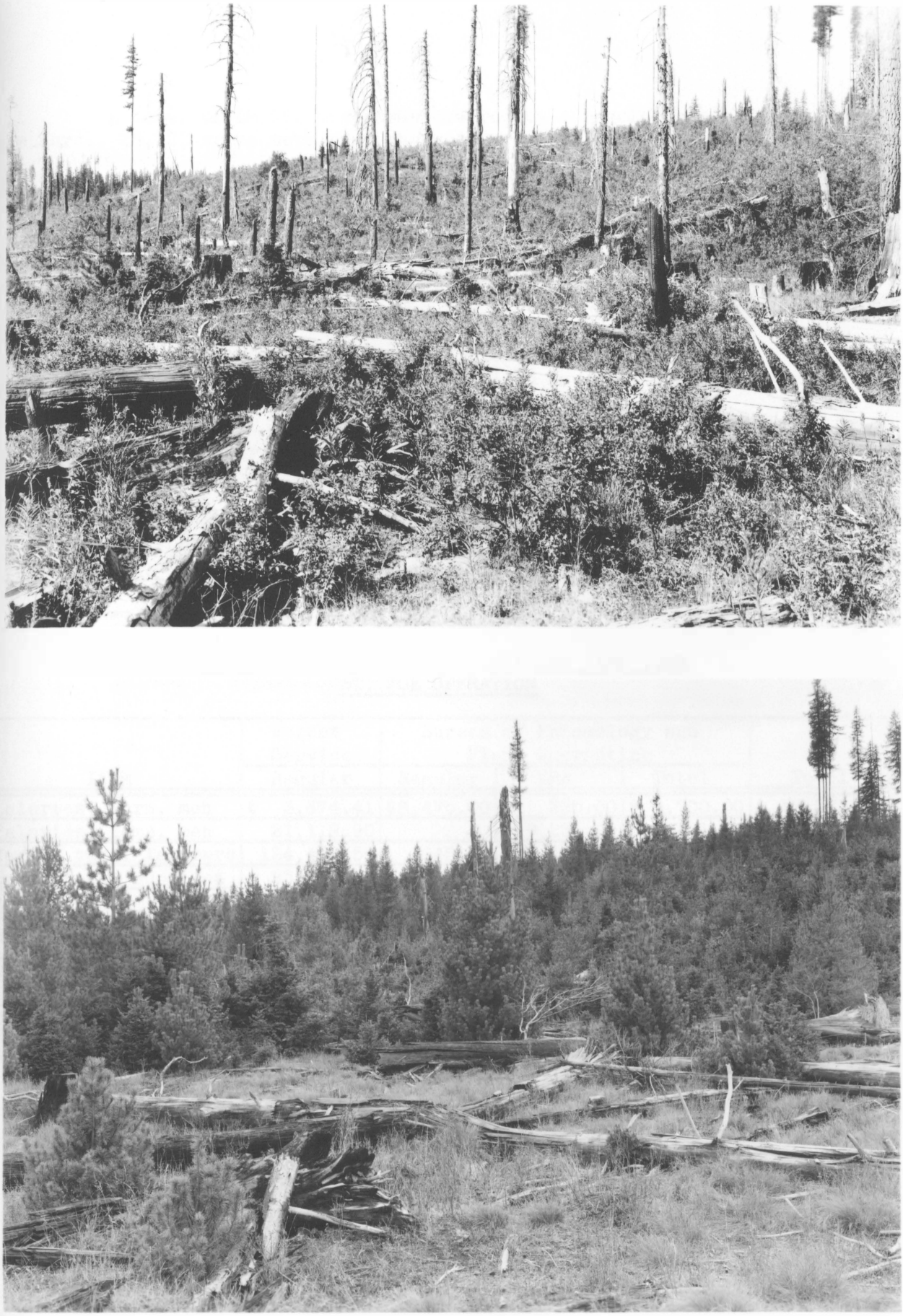
A concerted effort was made to confine all checkers to checking activities. However, the services of all men were made available for eradication whenever needed. When no regular check area was available the men were assigned to post check areas.

No deviations were made from standard checking methods except for the recording of bushes under one foot of live stem. Seedlings were recorded as in previous seasons but bushes with less than one foot of live stem that were not considered seedlings were recorded separately and classified as "knots".

In cooperation with eradication two flanking experiments were conducted during the field season. The results for each experiment will be included in a separate report.

Two checker foremen and 15 checkers, directed by a checker supervisor from the Bureau of Entomology and Plant Quarantine, comprised the checking personnel for the operation. (See organization chart for details.)

W 2695, 2693. Typical residual stands following logging of virgin white pine oreos. Species composition and density of residual stand will prevent the re-establishment of white pine. Logging disturbance has caused obundont ribes germination. Areas left in this condition will not be sufficiently productive of white pine to justify cost of blister rust control.



W 913, 913-9. Two pictures of the same area showing natural regeneration and growth of western white pine. Snagging has taken place through natural agencies. The upper picture was taken in 1931; the lower in 1940. This area was logged in 1914 or 1915 and was burned about 1917. Area in foreground is grazed annually by sheep.

A total of 38,763 acres was covered by a regular check for $0.16 per acre. 28,973 acres were post checked for $0.06 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 188,360.87
Bureau of Entomology and Plant Quarantine	Regular	9,420.00
	ERA	70,533.39
	Total	79,953.39
Total Expenditures	All Appropriations	$ 268,314.26

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
ST. JOE OPERATION

Item	Forest Service	Bureau of Entomology and Plant Quarantine			Total
	Regular	Regular	ERA	Total	
Salaries, perm. men	$ 3,674.41	$8,475.00	$ 225.00	$ 8,700.00	$ 12,374.41
Salaries, temp. men	21,119.90		9,231.61	9,231.61	30,351.51
Wages, temp. laborers	124,418.50	945.00	41,491.29	42,436.29	166,854.79
Subsistence supplies	25,438.49		14,280.96	14,280.96	39,719.45
Equipment	7,752.22		745.55	745.55	8,497.77
Trucks	564.69				564.69
Travel and transp.	2,797.75		1,788.60	1,788.60	4,586.35
Chemical	384.93				384.93
Twine	1,675.08				1,675.08
Other supplies	534.90		2,770.38	2,770.38	3,305.28
Total	$188,360.87	$9,420.00	$70,533.39	$79,953.39	$268,314.26

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES BY PROGRAMS
ST. JOE OPERATION

Program	Number of Effective Man Days	Expenditures According to Fund		Effective Man Day Cost
EQ-ERA	10,337	EQ-ERA	$ 66,893.39	$7.00
		EQ-Reg.	5,420.00	
		Total	72,313.39	
FS-Reg.	26,145	FS-Reg.	179,386.87	$7.00
		EQ-ERA	540.00	
		EQ-Reg.	3,000.00	
		Total	182,926.87	
CCC	14,036	FS-Reg.	8,642.50	CCC Funds not Included
		EQ-Reg.	1,000.00	
		Total	9,642.50	
Pine Disease Survey		FS-Reg.	331.50	
EQ-ERA Winter Project		EQ-ERA	3,100.00	
Total Cost of 1940 Program			$268,314.26	

	Forest Service	Bureau
Number of meals served	138,294	81,808
Average cost per meal	$0.184	$0.174
Pounds of twine used	8,800	2,369
Pounds of chemical used	4,900	1,600

SUMMARY OF RIBES ERADICATION, 1940
ST. JOE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Open Reproduction	1,458	17,727	2,565	21,750	35,060	3,046,696		5	11
Dense Reproduction		356	35	391	220	5,662		4	3
Open Pole	459	10,741	279	11,479	7,403	473,117		3	8
Dense Pole	138	763		901	199	12,221		1	2
Open Mature	212	2,687	53	2,952	4,397	483,015		9	15
Cutover		46		46	207	163,335			
Brush		99		99	36	1,822		5	57
All Upland	2,267	32,419	2,932	37,618	47,522	4,185,868		5	10
Stream (Hand)	20	559	566	1,145	2,769	335,601		18	17
Stream (Chemical)		95	46	141	227	12,498	4,166		
All Stream	20	559	566	1,145	2,996	348,099		18	17
All Types	2,287	32,978	3,498	38,763	50,518	4,533,967		5	10

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	1,458	3,498	1,042,812		2.40	715		10	22
Open Pole	459	313	46,624		.68	102		5	22
Dense Pole	138	1	64		.01	1		0	0
Open Mature	212	637	110,545		3.00	521		9	35
All Upland	2,267	4,449	1,200,045		1.96	529		7	22
Stream (Hand)	20	59	18,800		2.95	940			
All Types	2,287	4,508	1,218,845		1.97	533		7	22

TABLE NO. 3B - SECOND WORKING

Open Reproduction	17,727	28,667	1,887,476		1.62	106		5	11
Dense Reproduction	356	149	4,530		.42	13		4	3
Open Pole	10,741	6,960	422,364		.65	39		3	7
Dense Pole	763	198	12,157		.26	16		2	3
Open Mature	2,687	3,725	369,008		1.39	137		6	12
Cutover	46	207	163,335		4.50	3,551			
Brush	99	36	1,822		.36	18		5	57
All Upland	32,419	39,942	2,860,692		1.23	88		4	9
Stream (Hand)	559	1,781	238,066		3.19	426		18	19
Stream (Chemical)	95	180	8,685	2,895	1.89	91	30		
All Stream	559	1,961	246,751		3.51	441		18	19
All Types	32,978	41,903	3,107,443		1.27	94		5	10

TABLE NO. 3C - THIRD WORKING

Open Reproduction	2,565	2,895	116,408		1.13	45		6	8
Dense Reproduction	35	71	1,132		2.03	32			
Open Pole	279	130	4,129		.47	15			
Open Mature	53	35	3,462		.66	65		225	
All Upland	2,932	3,131	125,131		1.07	43		11	8
Stream (Hand)	566	929	78,735		1.64	139		11	3
Stream (Chemical)	46	47	3,813	1,271	1.02	83	28		
All Stream	566	976	82,548		1.72	146		11	3
All Types	3,498	4,107	207,679		1.17	59		11	8

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
ST. JOE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	EQ-ERA	572	556	140,077		.97	245		1	4
	FS-Reg.	1,210	2,524	846,498		2.09	700		13	26
	F-CCC	505	1,428	232,270		2.83	460		9	32
	Total	2,287	4,508	1,218,845		1.97	533		7	22
Second	EQ-ERA	8,612	9,038	1,002,156	900	1.05	116	30	4	10
	FS-Reg.	19,606	20,963	1,500,113	1,995	1.07	77	31	5	9
	F-CCC	4,760	11,902	605,174		2.50	127		5	14
	Total	32,978	41,903	3,107,443	2,895	1.27	94	30	5	10
Third	EQ-ERA	1,159	743	36,391		.64	31			
	FS-Reg.	1,967	2,658	148,616	1,271	1.35	76	27	6	8
	F-CCC	372	706	22,672		1.90	61		225	
	Total	3,498	4,107	207,679	1,271	1.17	59	28	11	8
All Workings	EQ-ERA	10,343	10,337	1,178,624	900	1.00	114	30	4	9
	FS-Reg.	22,783	26,145	2,495,227	3,266	1.15	110	29	5	9
	F-CCC	5,637	14,036	860,116		2.49	153		7	17
	Total	38,763	50,518	4,533,967	4,166	1.30	117	30	5	10

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
ST. JOE OPERATION

State	Working	Number of Acres Worked															
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total					
		Federal					Federal					Federal					
		Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Total
Idaho	First	985		985	77	653	312	80	392		180	1,297	80	1,377	77	833	2,287
	Second	14,173	360	14,533	2,525	7,308	2,983	123	3,106	1,782	3,724	17,156	483	17,639	4,307	11,032	32,978
	Third	1,731		1,731	41	567	252	46	298		861	1,983	46	2,029	41	1,428	3,498
	Total	16,889	360	17,249	2,643	8,528	3,547	249	3,796	1,782	4,765	20,436	609	21,045	4,425	13,293	38,763

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
ST. JOE OPERATION

Eradication Type	Average Results for All Areas				Area with More Than 25 Feet Live Stem Per Acre		
	Acres in Checked Area	Acres Checked	Ribes Per Acre			Ribes Per Acre	
			Bushes	Live Stem	Acres	Bushes	Live Stem
Open Reproduction	21,750	477	5	11	1,759	18	41
Dense Reproduction	391	16	4	3		0	0
Open Pole	11,479	384	3	8	572	15	56
Dense Pole	901	27	1	2		0	0
Open Mature	2,952	83	9	15	533	12	36
Cutover	46					0	0
Brush	99	4	5	57	42	13	139
All Upland	37,618	991	5	10	2,906	16	45
Stream	1,145	38	18	17		0	0
All Types	38,763	1,029	5	10	2,906	16	45

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Open Reproduction	1,458	113,535	929,274			3	1,042,812
	Open Pole	459	23,042	23,582				46,624
	Dense Pole	138	1	63				64
	Open Mature	212	72,767	6,735			31,043	110,545
	All Upland	2,267	209,345	959,654			31,046	1,200,045
	Stream	20	17,028	1,772				18,800
	All Types	2,287	226,373	961,426			31,046	1,218,845
Second	Open Reproduction	17,727	446,952	1,402,777	2,919	34,575	253	1,887,476
	Dense Reproduction	356	3,470	1,060				4,530
	Open Pole	10,741	179,800	233,077	931	8,556		422,364
	Dense Pole	763	8,278	3,879				12,157
	Open Mature	2,687	152,595	198,702	275		17,436	369,008
	Cutover	46	9,620	153,715				163,335
	Brush	99	456	1,366				1,822
	All Upland	32,419	801,171	1,994,576	4,125	43,131	17,689	2,860,692
	Stream	559	202,924	19,514	17,067	7,246		246,751
	All Types	32,978	1,004,095	2,014,090	21,192	50,377	17,689	3,107,443
Third	Open Reproduction	2,565	88,086	22,362	5,590	370		116,408
	Dense Reproduction	35	662	470				1,132
	Open Pole	279	1,395	2,717	17			4,129
	Open Mature	53	178	3,284				3,462
	All Upland	2,932	90,321	28,833	5,607	370		125,131
	Stream	566	58,654	1,365	11,945	10,584		82,548
	All Types	3,498	148,975	30,198	17,552	10,954		207,679
All Workings	Open Reproduction	21,750	648,573	2,354,413	8,509	34,945	256	3,046,696
	Dense Reproduction	391	4,132	1,530				5,662
	Open Pole	11,479	204,237	259,376	948	8,556		473,117
	Dense Pole	901	8,279	3,942				12,221
	Open Mature	2,952	225,540	208,721	275		48,479	483,015
	Cutover	46	9,620	153,715				163,335
	Brush	99	456	1,366				1,822
	All Upland	37,618	1,100,837	2,983,063	9,732	43,501	48,735	4,185,868
	Stream	1,145	278,606	22,651	29,012	17,830		348,099
	All Types	38,763	1,379,443	3,005,714	38,744	61,331	48,735	4,533,967

SUMMARY OF RIBES ERADICATION, 1929-1940
ST. JOE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Open Reproduction	168,427	56,184	2,979	227,590	297,121	85,640,148	
Dense Reproduction	42,990	3,405	35	46,430	12,651	1,893,986	
Open Pole	63,338	20,778	559	84,675	40,540	7,729,596	
Dense Pole	22,798	2,278		25,076	5,453	984,769	
Open Mature	182,294	9,663	53	192,010	84,568	22,459,361	
Dense Mature	9,745	274		10,019	1,614	267,557	
Cutover	1,009	180		1,189	864	263,717	
Brush	2,452	431		2,883	1,924	679,187	
Burn	2,224	106		2,330	1,164	806,886	
Subalpine	200			200	416	90,809	
All Upland	495,477	93,299	3,626	592,402	446,315	120,816,016	
Stream (Hand)	34,564	12,149	5,990	52,703	94,236	27,100,137	
Stream (Chemical)	7,384	3,009	493	10,886	26,500	2,362,743	787,581
Stream (Slash)	791	27		818	10,420	409,100	
All Stream	35,355	12,176	5,990	53,521	131,156	29,871,980	
All Types	530,832	105,475	9,616	645,923	577,471	150,687,996	

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man Days	Ribes	Gallons Spray
Open Reproduction	168,427	223,231	77,544,146		1.33	460	
Dense Reproduction	42,990	11,063	1,744,524		.26	41	
Open Pole	63,338	28,465	6,858,087		.45	108	
Dense Pole	22,798	4,576	915,519		.20	40	
Open Mature	182,294	77,018	21,424,575		.42	118	
Dense Mature	9,745	1,559	255,434		.16	26	
Cutover	1,009	654	100,332		.65	99	
Brush	2,452	1,881	676,620		.77	276	
Burn	2,224	1,061	795,464		.48	358	
Subalpine	200	416	90,809		2.08	454	
All Upland	495,477	349,924	110,405,510		.71	223	
Stream (Hand)	34,564	63,846	20,803,781		1.85	602	
Stream (Chemical)	7,384	21,605	2,007,093	669,031	2.93	272	91
Stream (Slash)	791	10,101	395,600		12.77	500	
All Stream	35,355	95,552	23,206,474		2.70	656	
All Types	530,832	445,476	133,611,984		.84	252	
TABLE NO. 8B - SECOND WORKING							
Open Reproduction	56,184	70,602	7,960,591		1.26	142	
Dense Reproduction	3,405	1,517	148,330		.45	44	
Open Pole	20,778	11,759	857,317		.57	41	
Dense Pole	2,278	877	69,250		.38	30	
Open Mature	9,663	7,515	1,031,324		.78	107	
Dense Mature	274	55	12,123		.20	44	
Cutover	180	210	163,385		1.17	908	
Brush	431	43	2,567		.10	6	
Burn	106	103	11,422		.97	108	
All Upland	93,299	92,681	10,256,309		.99	110	
Stream (Hand)	12,149	21,620	4,791,723		1.78	394	
Stream (Chemical)	3,009	4,495	320,694	106,898	1.49	107	36
Stream (Slash)	27	319	13,500		11.81	500	
All Stream	12,176	26,434	5,125,917		2.17	421	
All Types	105,475	119,115	15,382,226		1.13	146	
TABLE NO. 8C - THIRD WORKING							
Open Reproduction	2,979	3,288	135,411		1.10	45	
Dense Reproduction	35	71	1,132		2.03	32	
Open Pole	559	316	14,192		.57	25	
Open Mature	53	35	3,462		.66	65	
All Upland	3,626	3,710	154,197		1.02	43	
Stream (Hand)	5,990	8,770	1,504,633		1.46	251	
Stream (Chemical)	493	400	34,956	11,652	.81	71	24
All Stream	5,990	9,170	1,539,589		1.53	257	
All Types	9,616	12,880	1,693,786		1.34	176	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1940
ST. JOE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man Days	Ribes	Gallons Per Sprayed Area
First	FS-Reg.	81,810	83,069	24,866,105	262,145	1.02	304	95
	EQ-NIRA	42,366	25,571	7,734,978	10,839	.60	183	68
	FS-NIRA	70,714	44,246	14,845,626	101,476	.63	210	129
	EQ-ERA	147,063	92,678	29,461,510	52,667	.63	200	113
	FS-ERA	267	892	487,480		3.34	1,826	
	Cooperative	17,073	13,484	3,864,001	56,611	.79	226	41
	F-CCC	103,184	135,099	40,525,901	162,703	1.31	393	117
	S&P-CCC	68,355	50,437	11,826,383	22,590	.74	173	53
	Total	530,832	445,476	133,611,984	669,031	.84	252	91
Second	FS-Reg.	45,508	49,503	5,673,280	35,426	1.09	125	26
	EQ-NIRA	1,742	1,228	291,131		.70	167	
	EQ-ERA	40,141	35,218	5,630,738	10,557	.88	140	32
	Cooperative	489	291	48,475	2,674	.60	99	11
	F-CCC	15,347	28,518	3,283,003	29,289	1.86	214	55
	S&P-CCC	2,248	4,357	455,599	28,952	1.94	203	54
	Total	105,475	119,115	15,382,226	106,898	1.13	146	36
Third	FS-Reg.	4,262	5,707	668,838	4,130	1.34	157	28
	EQ-ERA	2,993	2,922	455,940	3,025	.98	152	12
	F-CCC	2,292	4,189	566,150	4,497	1.83	247	46
	S&P-CCC	69	62	2,858		.90	41	
	Total	9,616	12,880	1,693,786	11,652	1.34	176	24
All Workings	FS-Reg.	131,580	138,279	31,208,223	301,701	1.05	237	70
	EQ-NIRA	44,108	26,799	8,026,109	10,839	.61	182	68
	FS-NIRA	70,714	44,246	14,845,626	101,476	.63	210	129
	EQ-ERA	190,197	130,818	35,548,188	66,249	.69	187	64
	FS-ERA	267	892	487,480		3.34	1,826	
	Cooperative	17,562	13,775	3,912,476	59,285	.78	223	36
	F-CCC	120,823	167,806	44,375,054	196,489	1.39	367	98
	S&P-CCC	70,672	54,856	12,284,840	51,542	.78	174	53
	Total	645,923	577,471	150,687,996	787,581	.89	233	72

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1940
ST. JOE OPERATION

Working	Number of Acres Worked by Ownership Classes					
	Federal			State-Idaho	Private	Total
	Forest Service	Public Domain	Total			
First	211,700	12,578	224,278	66,807	239,747	530,832
Second	55,683	4,364	60,047	11,871	33,557	105,475
Third	5,110	130	5,240	765	3,611	9,616
All Workings	272,493	17,072	289,565	79,443	276,915	645,923

TABLE NO. 11

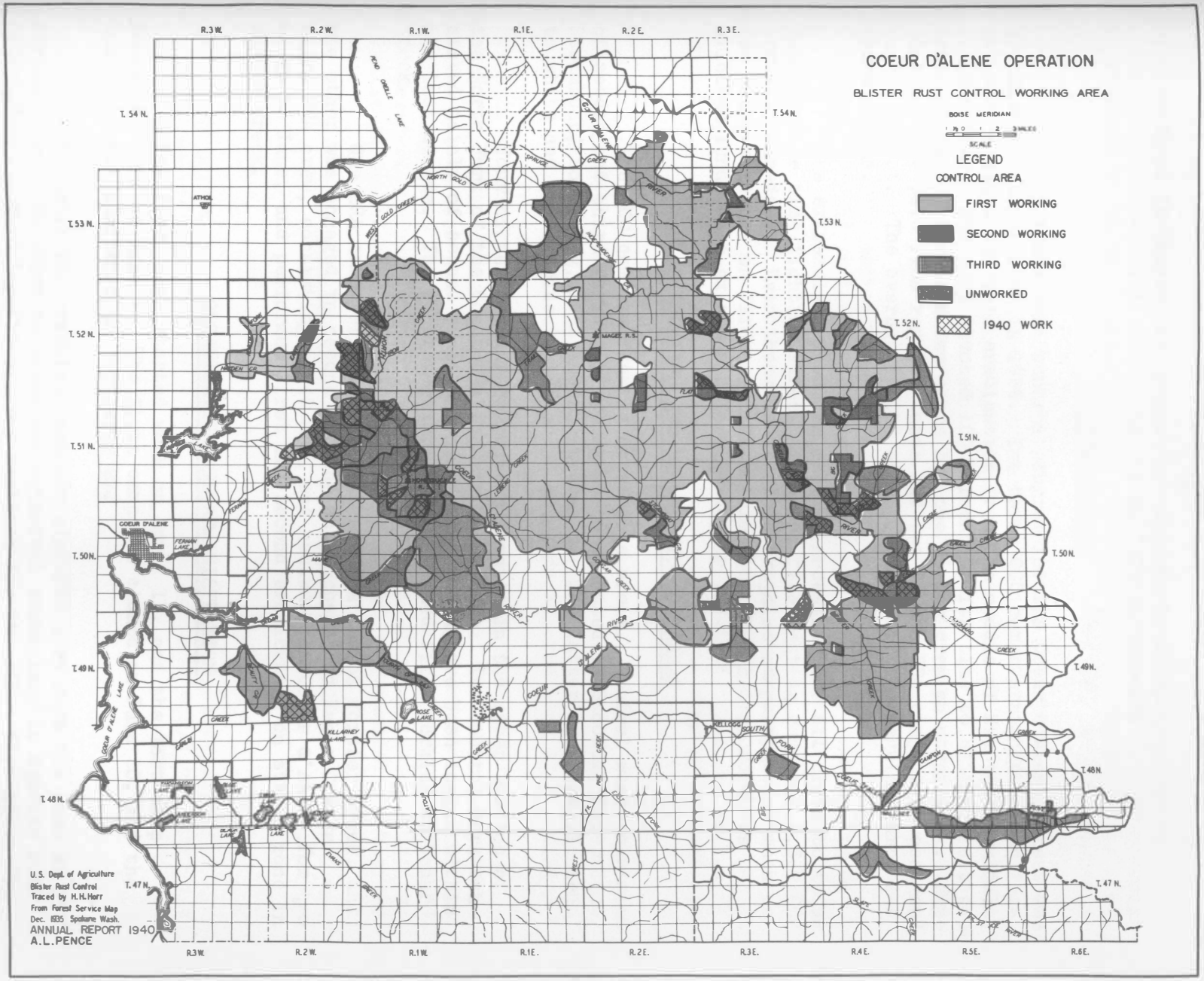
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1940
ST. JOE OPERATION

Ownership	Number of Acres			Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
Forest Service	211,700	89,291	300,991	11,089	312,080
Public Domain	12,578	10,847	23,425	1,040	24,465
Subtotal Federal	224,278	100,138	324,416	12,129	336,545
State	66,807	27,248	94,055	20,880	114,935
Private	239,747	136,247	375,994	57,451	433,445
Total	530,832	263,633	794,465	90,460	884,925

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1929-1940
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Open Reproduction	168,427	14,012,736	62,988,415	100,145	304,587	138,263		77,544,146
	Dense Reproduction	42,990	809,862	878,462	13,310	27,287	15,603		1,744,524
	Open Pole	63,338	2,778,102	3,921,862	19,835	61,506	76,782		6,858,087
	Dense Pole	22,798	454,628	457,362	1,335	1,993	201		915,519
	Open Mature	182,294	10,789,815	10,310,260	27,828	42,519	254,153		21,424,575
	Dense Mature	9,745	160,499	94,546	389				255,434
	Cutover	1,009	64,897	30,125	5,269	41			100,332
	Brush	2,452	93,470	579,731	1,987	1,432			676,620
	Burn	2,224	133,557	652,633	8,327	947			795,464
	Subalpine	200	54,975	35,834					90,809
	All Upland	495,477	29,352,541	79,949,230	178,425	440,312	485,002		110,405,510
	Stream	35,355	16,241,403	879,974	3,329,801	2,738,469	16,695	132	23,206,474
	All Types	530,832	45,593,944	80,829,204	3,508,226	3,178,781	501,697	132	133,611,984
Second	Open Reproduction	56,184	2,990,011	4,890,300	31,834	43,569	4,877		7,960,591
	Dense Reproduction	3,405	72,190	76,042		98			148,330
	Open Pole	20,778	407,474	435,411	1,319	13,113			857,317
	Dense Pole	2,278	37,389	31,277	584				69,250
	Open Mature	9,663	450,827	557,289	318	19	22,871		1,031,324
	Dense Mature	274	4,629	7,494					12,123
	Cutover	180	9,650	153,715		20			163,385
	Brush	431	456	2,111					2,567
	Burn	106	5,306	6,116					11,422
	All Upland	93,299	3,977,932	6,159,755	34,055	56,819	27,748		10,256,309
	Stream	12,176	3,007,793	162,265	1,066,114	742,201	6,073	141,471	5,125,917
	All Types	105,475	6,985,725	6,322,020	1,100,169	799,020	33,821	141,471	15,382,226
Third	Open Reproduction	2,979	92,895	36,556	5,590	370			135,411
	Dense Reproduction	35	662	470					1,132
	Open Pole	559	5,695	8,480	17				14,192
	Open Mature	53	178	3,284					3,462
	All Upland	3,626	99,430	48,790	5,607	370			154,197
	Stream	5,990	691,862	22,901	454,498	367,946		2,382	1,539,589
	All Types	9,616	791,292	71,691	460,105	368,316		2,382	1,693,786
All Workings	Open Reproduction	227,590	17,095,642	67,915,271	137,569	348,526	143,140		85,640,148
	Dense Reproduction	46,430	882,714	954,974	13,310	27,385	15,603		1,893,986
	Open Pole	84,675	3,191,271	4,365,753	21,171	74,619	76,782		7,729,596
	Dense Pole	25,076	492,017	488,639	1,919	1,993	201		984,769
	Open Mature	192,010	11,240,820	10,870,833	28,146	42,538	277,024		22,459,361
	Dense Mature	10,019	165,128	102,040	389				267,557
	Cutover	1,189	74,547	183,840	5,269	61			263,717
	Brush	2,883	93,926	581,842	1,987	1,432			679,187
	Burn	2,330	138,863	658,749	8,327	947			806,886
	Subalpine	200	54,975	35,834					90,809
	All Upland	592,402	33,429,903	86,157,775	218,087	497,501	512,750		120,816,016
	Stream	53,521	19,941,058	1,065,140	4,850,413	3,848,616	22,768	143,985	29,871,980
	All Types	645,923	53,370,961	87,222,915	5,068,500	4,346,117	535,518	143,985	150,687,996


COEUR D'ALENE OPERATION
BLISTER RUST CONTROL WORKING AREA
BOISE MERIDIAN
SCALE
LEGEND
CONTROL AREA
FIRST WORKING
SECOND WORKING
THIRD WORKING
UNWORKED
1940 WORK
R.3 W.
R.2 W.
R.1 W.
R.1 E.
R.2 E.
R.3 E.
R.4 E.
R.5 E.
R.6 E.
T. 54 N.
T. 53 N.
T. 52 N.
T. 51 N.
T. 50 N.
T. 49 N.
T. 48 N.
T. 47 N.
COEUR D'ALENE
COEUR D'ALENE LAKE
FERNAN LAKE
KILLARNEY LAKE
ROSE LAKE
BLACK LAKE
CAVE LAKE
HAUSER LAKE
HIDDEN LAKE
ATHOL
KOOTENAI
MAGEE R.S.
KELLOGG
SOUTH FORK
COEUR D'ALENE RIVER
ST. JOE RIVER
U.S. Dept. of Agriculture
Blister Rust Control
Traced by H.H. Horr
From Forest Service Map
Dec. 1935 Spokane Wash.
ANNUAL REPORT 1940
A.L. PENCE

RIBES ERADICATION, COEUR D'ALENE OPERATION, 1940

By
Neal D. Nelson, Associate Pathologist, U. S. Forest Service
A. L. Pence, Jr., Assistant Pathologist

INTRODUCTION

The blister rust control program for the Coeur d'Alene Forest was practically the same as in 1939. The three CCC camps assigned to the forest were engaged in ribes eradication from the middle of May to the middle of September. One camp devoted 100 percent of its time to blister rust control. Each of the other two camps had one 25-man crew on other work. Five 30-man camps paid from regular funds and two 60-man ERA camps were assigned to the forest. The average period of employment for the regular camps was three months.

The extremely dry summer made it necessary for all crews to spend considerable time fighting fires. In fact, firefighting consumed 6,539 CCC enrollee man-days. Even though some of the regular camps spent as much as two weeks straight on fires no time was lost to eradication work, as allotted funds were expended before September 15.

LOCATION AND DESCRIPTION OF AREAS

The CCC camps worked in accessible areas. Control work consisted of second and third working of young stands located in Skookum, Deception, Steamboat, Lost, Big, Flat and Brett Creeks. The latter area was planted to white and yellow pine in 1934.

Four of the regular camps were located in the upper portion of the North Fork of the Coeur d'Alene River drainage. The control work consisted mainly of second eradication on areas which have been logged within the last decade. The other regular camp performed first working on Cedar Creek.

One ERA camp performed initial eradication on Fortier Creek, and the other was engaged in second working on Prichard and Eagle Creeks. A third ERA crew, consisting of 40 men, was hauled from Coeur d'Alene for two weeks in June, and performed first and second eradication on stream zone in Hayden Creek.

ORGANIZATION AND ADMINISTRATION

The first camp started work on April 17, and the last camp commenced work on June 6. The first camp was closed on June 30, and the last work was performed on September 27.

The work was organized and administered very much the same as in former years. In order to allow the technical supervisor to operate more effectively, a checking foreman was employed for the first time since 1936. He acted in the capacity of an assistant checking supervisor, as he covered the entire operation.

METHODS AND EQUIPMENT

Eradication methods and equipment as described in the "Ribes Eradication Manual" were employed. The Sheeley ribes hook, described in the 1939 annual report, was used effectively all summer, and it is intended to make more use of this tool.

The procedure outlined in Technical Memorandum No. T-6, designed to reduce eradication costs on cutover areas, was given a practical test on 150 acres of land cutover in 1934. Although detailed records were kept in order to determine the comparative efficiency with ordinary eradication practices, no analysis has yet been made. A complete explanation will be made in a special report.

The possibility of using a one-man eradication crew was tried experimentally. This work shows definite possibilities and will also be explained in a separate report.

The checker-flanker system of ribes eradication was attempted, using a checker and CCC's as flankers. This method was not successful using this type of crew. It is felt that this system will have very limited application on this operation.

CHECKING

Eight checkers and one checker foreman were employed during the past season. Their work consisted largely of regular checking and post checking, with some advance checking being performed.

A total of 15,911 acres of worked area was subjected to a strip check. Approximately 16 per cent of this ground was rechecked once, and two per cent was checked a third time. Heretofore, the per cent of recheck has been much higher. The reduction this year is the result of systematically mopping up areas in advance of the check, which was done on all heavy ribes areas. The following table shows the per acre cost of all regular checking:

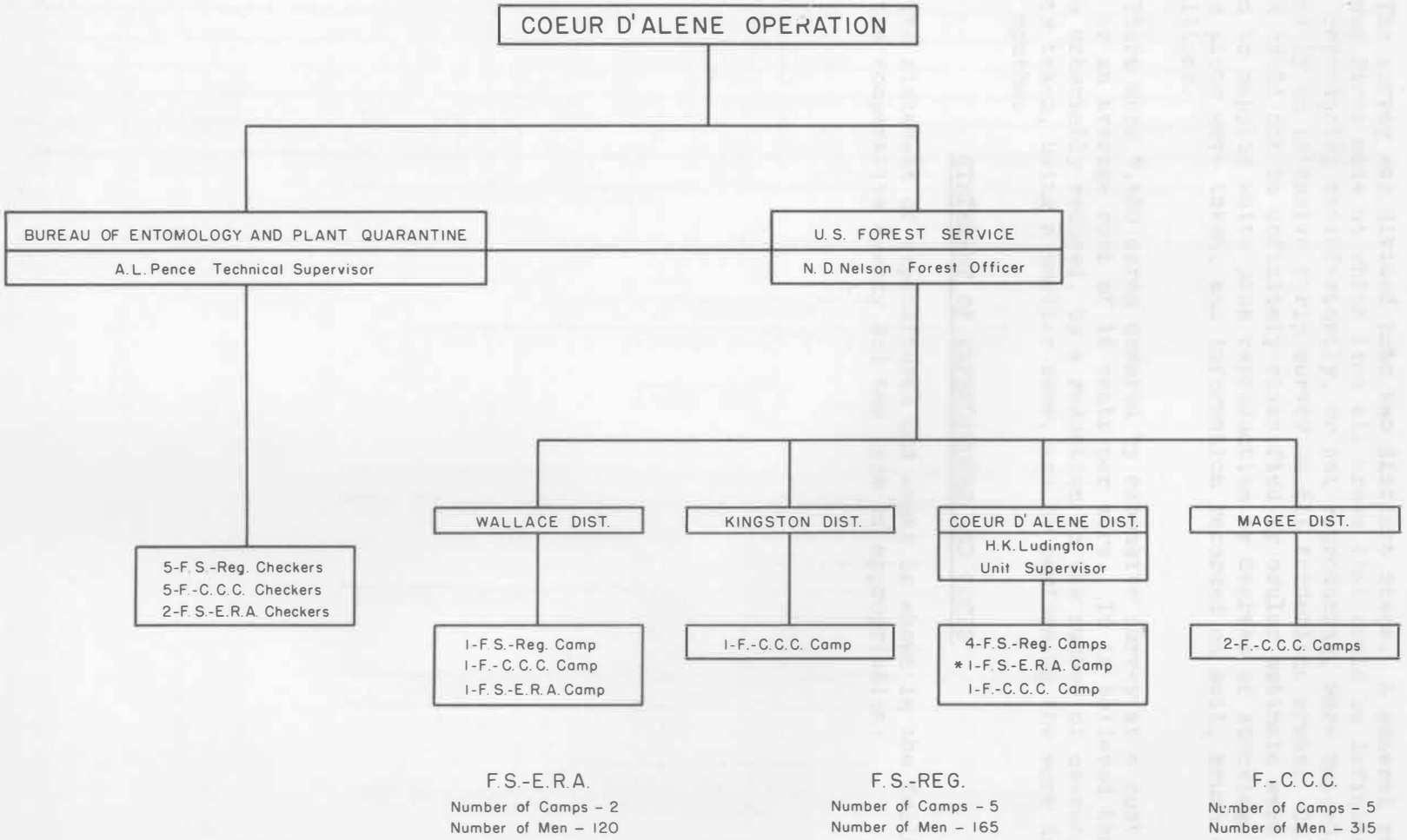
Activity	Cost per Acre
FS-Reg.	$0.172
F-CCC	0.230
FS-ERA	0.089

The average cost of regular checking for the operation was $0.163 per acre, and 6,350 acres were subjected to a post check at a cost of $0.135 per acre.

SURVEYS

A white pine reproduction survey was made to obtain information on cutover and burned areas. During August and the first fifteen days in September one man worked on the survey. A six-man crew was organized at the close of the eradication season composed of camp foremen and checkers who were qualified to perform such work. This crew functioned for one month.

ORGANIZATION CHART



F.S.-E.R.A.
Number of Camps – 2
Number of Men – 120

F.S.-REG.
Number of Camps – 5
Number of Men – 165

F.-C.C.C.
Number of Camps – 5
Number of Men – 315

Total Number of Men on Blister Rust Work – 600

*In Operation from April 20 to June 30

1940

The survey was divided into two distinct steps. A general reconnaissance was first made at which time all areas that could be definitely classed as reproducing satisfactorily, or not reproducing, were mapped. This was followed by an intensive strip survey on all borderline areas. Only those areas which could not be definitely classified by ocular estimate were cruised. In addition to mapping white pine reproduction by degrees of stocking, overwood sample plots were taken, and information recorded on soil, brush and ribes conditions.

There were 7,430 acres covered by extensive survey at a cost of $1,186.79, or an average cost of 16 cents per acre. It is believed that this cost can be materially reduced, by a reduction in the number of overwood sample plots taken, using a smaller crew, and by performing the work during the summer months.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 67,950.83
	ERA	36,577.78
	Total	104,528.61
Bureau of Entomology and Plant Quarantine	Regular	2,700.00
	ERA	192.76
	Total	2,892.76
Total Expenditures	All Appropriations	$107,421.37

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
COEUR D'ALENE OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine			Total
	Regular	ERA	Total	Regular	ERA	Total	
Salaries, perm. men	$ 1,994.55		$ 1,994.55	$2,700.00		$2,700.00	$ 4,694.55
Salaries, temp. men	14,637.11	$ 2,097.43	16,734.54				16,734.54
Wages, temp. laborers	37,267.24	26.424.96	53,692.20				63,692.20
Subsistence supplies	9,167.29	6,291.92	15,459.21				15,459.21
Equipment	2,085.56	300.09	2,382.65		$ 3.04	3.04	2,385.69
Travel and transp.	1,176.49	580.17	1,756.66		189.72	189.72	1,946.38
Other supplies	1,625.59	883.21	2,508.80				2,508.80
Total	$67,950.83	$36,577.78	$104,528.61	$2,700.00	$192.76	$2,892.76	$107,421.37

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
COEUR D'ALENE OPERATION

Program	Number of Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
FS-ERA	4,854	FS-ERA	$ 36,577.78	$7.85
		EQ-ERA	192.76	
		FS-Reg.	1,316.66	
		Total	38,087.20	
FS-Reg.	8,803	FS-Reg.	63,961.46	7.42
		EQ-Reg.	1,350.00	
		Total	65,311.46	
F-CCC	4,456	FS-Reg.	1,426.47	CCC Funds Not Included
		EQ-Reg.	1,350.00	
		Total	2,776.47	
Pine Disease Survey		FS-Reg.	59.45	
White Pine Survey		FS-Reg.	1,186.79	
Total Cost of 1940 Program			$107,421.37	

	Forest Service Camps	
	Regular	ERA
Number of meals served	40,630	24,105
Average cost per meal	$0.21	$0.206
Pounds of twine used	2,000	

SUMMARY OF RIBES ERADICATION, 1940
COEUR D'ALENE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	825	4,312	677	5,814	9,790	832,599	3.9	10.2
Dense Reproduction		516	19	535	755	36,310	2.5	6.7
Open Pole	1,412	701	81	2,194	1,857	185,734	3.1	5.4
Dense Pole	272	701	75	1,048	571	93,949	4.7	8.7
Open Mature	203	443	381	1,027	760	52,942	3.4	5.6
Cutover	480	1,380	1,339	3,199	4,980	753,541	8.3	11.4
Brush	136			136	484	67,463	7.6	15.0
Burn		51		51	229	146,911	8.5	6.0
All Upland	3,328	8,104	2,572	14,004	19,426	2,169,449	4.8	9.2
Stream (Hand)	78	849	687	1,614	2,398	287,780	6.1	14.1
Stream (Zone)	90	203		293	302	77,141	6.9	16.9
All Stream	168	1,052	687	1,907	2,700	364,921	6.2	14.6
All Types	3,496	9,156	3,259	15,911	22,126	2,534,370	3.2	10.7

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	825	1,899	381,231	2.30	462	5.9	16.0
Open Pole	1,412	1,240	121,262	.88	86	1.4	4.9
Dense Pole	272	210	26,706	.77	98	1.2	4.6
Open Mature	203	73	8,249	.36	41	1.7	4.2
Cutover	480	933	211,751	1.94	441	9.1	20.2
Brush	136	484	67,463	3.56	496	7.6	15.0
All Upland	3,328	4,839	816,662	1.45	245	3.9	10.3
Stream (Hand)	78	242	50,251	3.10	644	3.4	7.8
Stream (Zone)	90	123	40,256	1.37	447	16.1	30.2
All Stream	168	365	90,507	2.17	539	7.0	14.2
All Types	3,496	5,204	907,169	1.49	259	4.7	11.3

TABLE NO. 3B - SECOND WORKING

Open Reproduction	4,312	6,823	393,769	1.58	91	3.5	9.2
Dense Reproduction	516	731	35,790	1.42	69	2.5	6.9
Open Pole	701	567	59,488	.81	85	7.0	6.7
Dense Pole	701	338	66,740	.48	95	6.7	11.6
Open Mature	443	422	35,630	.95	80	3.3	5.9
Cutover	1,380	2,388	470,937	1.73	341	9.0	13.0
Burn	51	229	146,911	4.49	2,881	8.5	6.0
All Upland	8,104	11,498	1,209,265	1.42	149	5.0	9.6
Stream (Hand)	849	1,409	182,154	1.66	215	5.5	11.8
Stream (Zone)	203	179	36,885	.88	182	2.2	10.3
All Stream	1,052	1,588	219,039	1.51	208	4.8	11.5
All Types	9,156	13,086	1,428,304	1.43	156	5.0	10.1

TABLE NO. 3C - THIRD WORKING

Open Reproduction	677	1,068	57,599	1.58	85	3.3	8.5
Dense Reproduction	19	24	520	1.26	27	1.4	1.4
Open Pole	81	50	4,984	.62	62	0	0
Dense Pole	75	23	503	.31	7	.9	.9
Open Mature	381	265	9,063	.70	24	4.8	6.4
Cutover	1,339	1,659	70,853	1.24	53	7.2	5.3
All Upland	2,572	3,089	143,522	1.20	56	5.6	5.9
Stream (Hand)	687	747	55,375	1.09	81	9.9	25.1
All Types	3,259	3,836	198,897	1.18	61	7.1	12.4

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
					Man Days	Ribes	Bushes	Live Stem
First	FS-ERA	1,690	1,624	224,071	.96	133	3.6	7.9
	FS-Reg.	1,691	3,277	672,622	1.94	398	6.2	13.6
	F-CCC	115	303	10,476	2.63	91	5.0	18.4
	Total	3,496	5,204	907,169	1.49	259	4.8	10.7
Second	FS-ERA	2,733	2,980	274,299	1.09	100	2.7	9.5
	FS-Reg.	3,712	5,026	976,945	1.35	263	7.7	12.2
	F-CCC	2,711	5,080	177,060	1.87	65	2.5	5.4
	Total	9,156	13,086	1,428,304	1.43	156	4.9	10.0
Third	FS-ERA	487	250	24,398	.51	50	1.2	4.4
	FS-Reg.	1,142	500	68,920	.44	60	11.5	6.4
	F-CCC	1,630	3,086	105,579	1.89	65	7.3	17.1
	Total	3,259	3,836	198,897	1.18	61	7.1	12.4
All Workings	FS-ERA	4,910	4,854	522,768	.99	106	2.9	8.6
	FS-Reg.	6,545	8,803	1,718,487	1.34	263	7.6	12.1
	F-CCC	4,456	8,469	293,115	1.90	66	4.9	11.3
	Total	15,911	22,126	2,534,370	1.39	159	5.2	10.7

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
COEUR D'ALENE OPERATION

State	Working	Number of Acres Worked By Forest Service		Total
		Forest Service	Private	
Idaho	First	3,173	323	3,496
	Second	8,084	1,072	9,156
	Third	2,746	513	3,259
	Total	14,003	1,908	15,911

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
COEUR D'ALENE OPERATION

Eradication Type	Average Results for All Areas				Areas with More Than 25 Feet Live Stem per Acre		
	Acres in Checked Area	Acres Checked	Ribes per Acre		Acres	Ribes per Acre	
			Bushes	Live Stem		Bushes	Live Stem
Open Reproduction	5,814	224	3.9	10.2	792	12.1	36.2
Dense Reproduction	535	22	2.5	6.7	33	12.3	56.2
Open Pole	2,194	79	3.1	5.4			
Dense Pole	1,048	40	4.7	8.7			
Open Mature	1,027	40	3.4	5.6			
Cutover	3,199	125	8.3	11.4	357	26.3	41.5
Brush	136	5	7.6	15.0			
Burn	51	2	8.5	6.0			
All Upland	14,004	537	4.8	9.2	1,182	16.4	38.3
Stream (Hand)	1,614	163	6.1	14.1	94	27.8	148.8
Stream (Zone)	293	36	6.9	16.9	90	16.1	30.2
All Stream	1,907	199	6.2	14.6	184	20.0	69.8
All Types	15,911	736	5.2	10.7	1,366	17.4	47.0

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	
First	Open Reproduction	825	204,831	176,400			381,231
	Open Pole	1,412	61,938	59,324			121,262
	Dense Pole	272	20,000	6,706			26,706
	Open Mature	203	4,843	3,406			8,249
	Cutover	480	188,383	23,368			211,751
	Brush	136	8,588	58,875			67,463
	All Upland	3,328	488,583	328,079			816,662
	Stream	168	86,037	4,470			90,507
	All Types	3,496	574,620	332,549			907,169
Second	Open Reproduction	4,312	254,749	133,719	613	4,688	393,769
	Dense Reproduction	516	15,397	20,393			35,790
	Open Pole	701	41,809	17,679			59,488
	Dense Pole	701	46,406	20,334			66,740
	Open Mature	443	23,695	11,935			35,630
	Cutover	1,380	318,997	151,940			470,937
	Burn	51	86,477	60,434			146,911
	All Upland	8,104	787,530	416,434	613	4,688	1,209,265
	Stream	1,052	156,110	1,188	61,741		219,039
	All Types	9,156	943,640	417,622	62,354	4,688	1,428,304
Third	Open Reproduction	677	48,093	8,439	1,067		57,599
	Dense Reproduction	19	520				520
	Open Pole	81	4,984				4,984
	Dense Pole	75	503				503
	Open Mature	381	8,537	526			9,063
	Cutover	1,339	56,690	14,163			70,853
	All Upland	2,572	119,327	23,128	1,067		143,522
	Stream	687	29,518	72	25,785		55,375
	All Types	3,259	148,845	23,200	26,852		198,897
All Workings	Open Reproduction	5,814	507,673	318,558	1,680	4,688	832,599
	Dense Reproduction	535	15,917	20,393			36,310
	Open Pole	2,194	108,731	77,003			185,734
	Dense Pole	1,048	66,909	27,040			93,949
	Open Mature	1,027	37,075	15,867			52,942
	Cutover	3,199	564,070	189,471			753,541
	Brush	136	8,588	58,875			67,463
	Burn	51	86,477	60,434			146,911
	All Upland	14,004	1,395,440	767,641	1,680	4,688	2,169,449
	Stream	1,907	271,665	5,730	87,526		364,921
	All Types	15,911	1,667,105	773,371	89,206	4,688	2,534,370

SUMMARY OF RIBES ERADICATION, 1927-1940
COEUR D'ALENE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	68,049	10,278	1,619	79,946	139,803	19,374,680
Dense Reproduction	11,832	1,365	19	13,216	12,323	1,206,154
Open Pole	49,527	4,853	658	55,038	31,196	4,544,978
Dense Pole	16,439	929	167	17,535	4,884	696,469
Open Mature	128,834	10,195	1,826	140,855	95,720	15,190,622
Dense Mature	13.023	651		13,674	2,100	261,153
Cutover	11,665	7,032	3,961	22,658	32,626	6,638,273
Brush	10,555	507		11,062	15,717	2,332,028
Burn	5,619	51		5,670	3,738	900,870
Subalpine	485			485	283	76,762
Meadow-Field	157			157		
All Upland	316,185	35,861	8,250	360,296	338,390	51,221,989
Stream (Hand)	13,124	4,250	1,181	18,555	58,795	12,215,888
Stream (Slash)	78	13		91	1,792	68,731
Stream (Machine)	1,045	87		1,132	5,038	566,000
Stream (Zone)	208	2,477		2,685	2,139	227,333
All Stream	14,455	6,827	1,181	22,463	67,764	13,077,952
All Types	330,640	42,688	9,431	382,759	406,154	64,299,941

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Open Reproduction	68,049	117,337	17,699,892	1.72	260
Dense Reproduction	11,832	10,586	1,075,972	.89	91
Open Pole	49,527	27,211	3,900,219	.55	79
Dense Pole	16,439	4,366	617,178	.27	38
Open Mature	128,834	86,481	13,988,483	.67	109
Dense Mature	13,023	1,761	222,188	.14	17
Cutover	11,665	16,011	4,336,397	1.37	372
Brush	10,555	14,983	2,234,161	1.42	212
Burn	5,619	3,509	753,959	.62	134
Subalpine	485	283	76,762	.58	158
Meadow-Field	157				
All Upland	316,185	282,528	44,905,211	.89	142
Stream (Hand)	13,124	48,603	10,931,245	3.70	833
Stream (Slash)	78	1,340	64,934	17.18	832
Stream (Machine)	1,045	4,616	522,500	4.42	500
Stream (Zone)	208	270	55,658	1.30	268
All Stream	14,455	54,829	11,574,337	3.79	801
All Types	330,640	337,357	56,479,548	1.02	171

TABLE NO. 8B - SECOND WORKING

Open Reproduction	10,278	19,478	1,489,312	1.90	145
Dense Reproduction	1,365	1,713	129,662	1.25	95
Open Pole	4,853	3,335	537,207	.69	111
Dense Pole	929	424	73,713	.46	79
Open Mature	10,195	8,290	1,092,249	.81	107
Dense Mature	651	339	38,965	.52	60
Cutover	7,032	10,719	1,751,456	1.52	249
Brush	507	734	97,867	1.45	193
Burn	51	229	146,911	4.49	2,881
All Upland	35,861	45,261	5,357,342	1.26	149
Stream (Hand)	4,250	8,823	1,189,300	2.08	280
Stream (Slash)	13	452	3,794	34.77	292
Stream (Machine)	87	422	43,500	4.85	500
Stream (Zone)	2,477	1,869	171,675	.75	69
All Stream	6,827	11,566	1,408,269	1.69	206
All Types	42,688	56,827	6,765,611	1.33	158

TABLE NO. 8C - THIRD WORKING

Open Reproduction	1,619	2,988	185,476	1.85	115
Dense Reproduction	19	24	520	1.26	27
Open Pole	658	650	107,552	.99	163
Dense Pole	167	94	5,578	.56	33
Open Mature	1,826	943	109,890	.52	60
Cutover	3,961	5,896	550,420	1.49	139
All Upland	8,250	10,601	959,436	1.28	116
Stream (Hand)	1,181	1,369	95,346	1.16	81
All Types	9,431	11,970	1,054,782	1.27	112

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1940
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
					Man Days	Ribes
First	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	FS-Reg.	36,138	36,989	7,343,975	1.02	203
	FS-NIRA	86,083	59,504	13,399,102	.69	156
	EQ-ERA	40,997	35,497	6,584,066	.87	161
	FS-ERA	16,005	19,408	3,063,881	1.21	191
	F-CCC	125,641	177,608	23,242,141	1.41	185
	Total	330,640	337,357	56,479,548	1.02	171
Second	FS-Reg.	15,455	15,447	3,191,362	1.00	206
	FS-NIRA	5,300	2,869	498,629	.54	94
	EQ-ERA	42	44	5,151	1.05	123
	FS-ERA	3,836	4,866	634,163	1.27	165
	F-CCC	18,055	33,601	2,436,306	1.86	135
	Total	42,688	56,827	6,765,611	1.33	158
Third	FS-Reg.	4,863	4,216	615,191	.87	127
	FS-ERA	487	250	24,398	.51	50
	F-CCC	4,081	7,504	415,193	1.84	102
	Total	9,431	11,970	1,054,782	1.27	112
All Workings	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	FS-Reg.	56,456	56,652	11,150,528	1.00	198
	FS-NIRA	91,383	62,373	13,897,731	.68	152
	EQ-ERA	41,039	35,541	6,589,217	.87	161
	FS-ERA	20,328	24,524	3,722,442	1.21	183
	F-CCC	147,777	218,713	26,093,640	1.48	177
	Total	382,759	406,154	64,299,941	1.06	168

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1940
COEUR D'ALENE OPERATION

Working	Number of Acres Worked by Ownership Classes			Total
	Forest Service	State - Idaho	Private	
First	309,979	5,659	15,002	330,640
Second	39,453	530	2,705	42,688
Third	8,406	200	825	9,431
All Workings	357,838	6,389	18,532	382,759

TABLE NO. 11

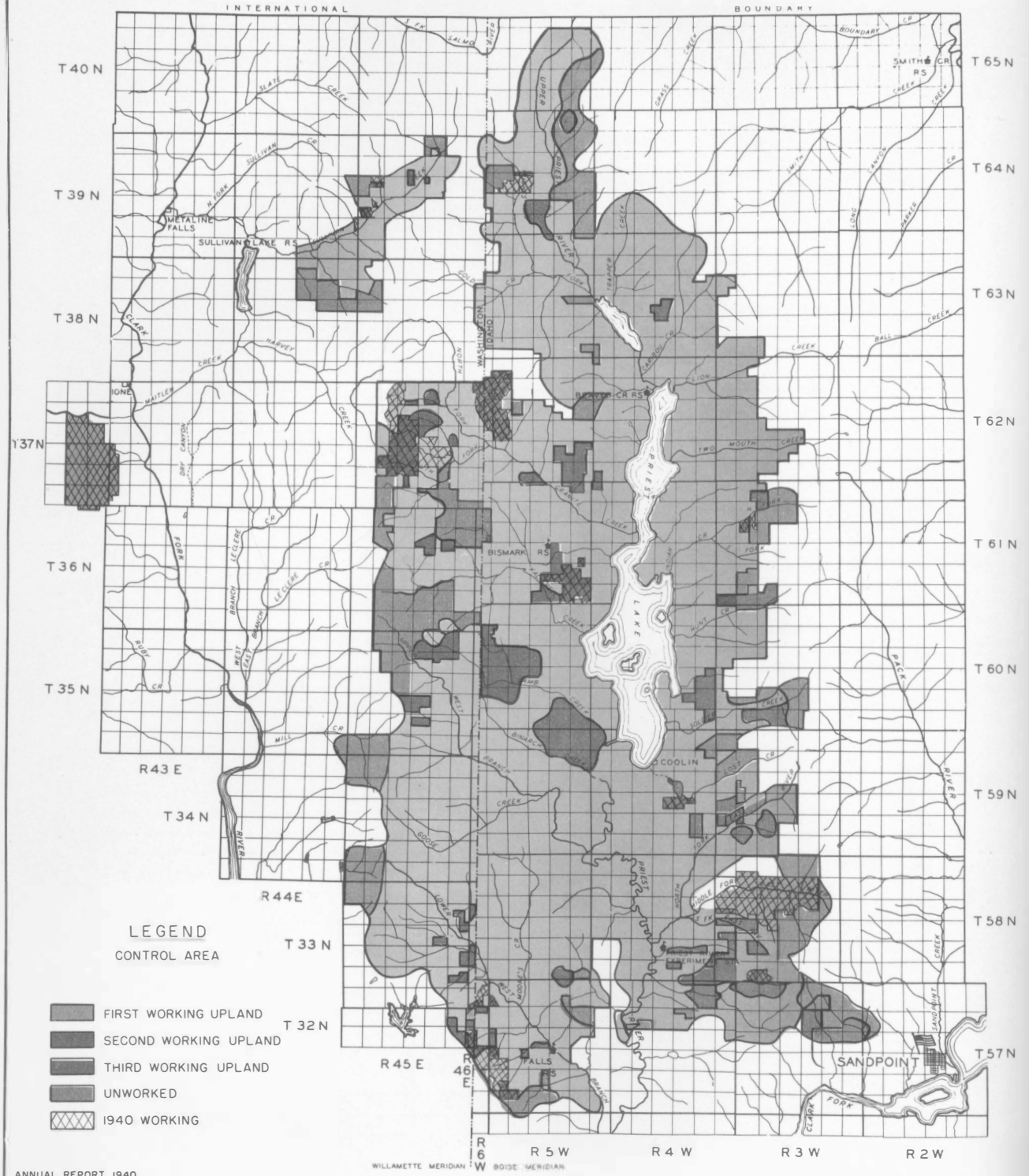
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1927-1940
COEUR D'ALENE OPERATION

Ownership Class	Number of Acres			Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
Forest Service	309,979	37,723	347,702	10,303	358,005
Public Domain		2,110	2,110		2,110
Subtotal Federal	309,979	39,833	349,812	10,303	360,115
State - Idaho	5,659	1,171	6,830		6,830
Private	15,002	8,497	23,499	5,151	28,650
Total	330,640	49,501	380,141	15,454	395,595

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1927-1940
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Open Reproduction	68,049	10,320,289	6,779,650	2,227	498,923	98,803	17,699,892
	Dense Reproduction	11,832	665,227	402,844		5,323	2,578	1,075,972
	Open Pole	49,527	2,194,076	1,642,763	12,246	9,082	42,052	3,900,219
	Dense Pole	16,439	456,946	155,203		3,741	1,288	617,178
	Open Mature	128,834	10,859,965	2,899,230	1	79,624	149,663	13,988,483
	Dense Mature	13,023	193,735	17,816		9,778	859	222,188
	Cutover	11,665	2,940,036	1,351,239	1	17,536	27,585	4,336,397
	Brush	10,555	778,322	1,424,834		25,748	5,257	2,234,161
	Burn	5,619	344,681	390,324		13,530	5,424	753,959
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	316,185	28,808,838	15,085,104	14,475	663,285	333,509	44,905,211
	Stream	14,455	7,095,474	182,129	31,474	4,196,873	68,387	11,574,337
	All Types	330,640	35,904,312	15,267,233	45,949	4,860,158	401,896	56,479,548
Second	Open Reproduction	10,278	753,328	714,425		12,807	8,752	1,489,312
	Dense Reproduction	1,365	102,536	27,032		11	83	129,662
	Open Pole	4,853	424,818	103,206	4,736	3,882	565	537,207
	Dense Pole	929	52,890	20,823				73,713
	Open Mature	10,195	776,536	300,512		11,089	4,112	1,092,249
	Dense Mature	651	37,723	1,017			225	38,965
	Cutover	7,032	1,336,658	398,288		13,430	3,080	1,751,456
	Brush	507	11,517	86,350				97,867
	Burn	51	86,477	60,434				146,911
	All Upland	35,861	3,582,483	1,712,087	4,736	41,219	16,817	5,357,342
	Stream	6,827	966,024	42,668		393,576	6,001	1,408,269
	All Types	42,688	4,548,507	1,754,755	4,736	434,795	22,818	6,765,611
Third	Open Reproduction	1,619	118,827	65,582		1,067		185,476
	Dense Reproduction	19	520					520
	Open Pole	658	96,829	10,723				107,552
	Dense Pole	167	5,578					5,578
	Open Mature	1,826	95,320	14,570				109,890
	Cutover	3,961	471,005	79,415				550,420
	All Upland	8,250	788,079	170,290		1,067		959,436
	Stream	1,181	67,556	113		27,677		95,346
	All Types	9,431	855,635	170,403		28,744		1,054,782
All Workings	Open Reproduction	79,946	11,192,444	7,559,657	2,227	512,797	107,555	19,374,680
	Dense Reproduction	13,216	768,283	429,876		5,334	2,661	1,206,154
	Open Pole	55,038	2,715,723	1,756,692	16,982	12,964	42,617	4,544,978
	Dense Pole	17,535	515,414	176,026		3,741	1,288	696,469
	Open Mature	140,855	11,731,821	3,214,312	1	90,713	153,775	15,190,622
	Dense Mature	13,674	231,458	18,833		9,778	1,084	261,153
	Cutover	22,658	4,747,699	1,828,942	1	30,966	30,665	6,638,273
	Brush	11,062	789,839	1,511,184		25,748	5,257	2,332,028
	Burn	5,670	431,158	450,758		13,530	5,424	900,870
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	360,296	33,179,400	16,967,481	19,211	705,571	350,326	51,221,989
	Stream	22,463	8,129,054	224,910	31,474	4,618,126	74,388	13,077,952
	All Types	382,759	41,308,454	17,192,391	50,685	5,323,697	424,714	64,299,941



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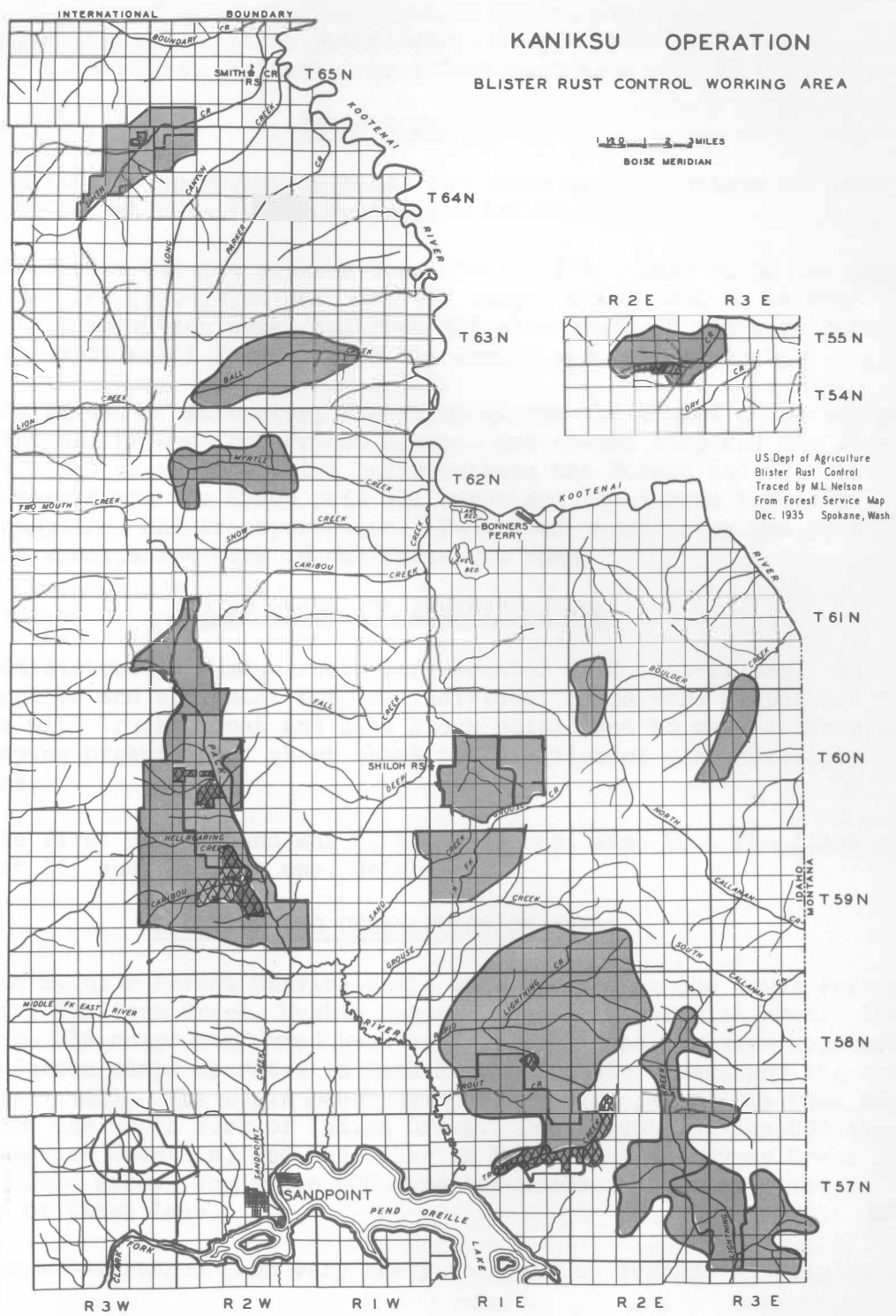
F. O. WALTERS


KANIKSU OPERATION
BLISTER RUST CONTROL WORKING AREA
0 1 2 3 MILES
BOISE MERIDIAN
INTERNATIONAL BOUNDARY
T65N
T64N
T63N
T62N
T61N
T60N
T59N
T58N
T57N
R3W
R2W
R1W
R1E
R2E
R3E
T55N
T54N
R2E
R3E
SMITH CR
KOOTENAI RIVER
BALL CREEK
MYRTLE CREEK
TWO MOUTH CREEK
SNOW CREEK
CARIBOU CREEK
BONNERS FERRY
AIR BASE
BOULDER CREEK
FALL CREEK
SHILOH RS
DEEP CR
HELLROARING CREEK
CARIBOU CREEK
SAND CREEK
GROUSE CREEK
MIDDLE FK EAST RIVER
SANDPOINT
PEND OREILLE LAKE
CLARK FORK
LIGHTNING CR
TROUT CR
NORTH CALLAHAN CR
SOUTH CALLAHAN CR
IDAHO MONTANA
DRY CR
U.S. Dept of Agriculture
Blister Rust Control
Traced by M.L. Nelson
From Forest Service Map
Dec. 1935 Spokane, Wash

RIBES ERADICATION, KANIKSU OPERATION, 1940

by
Frank O. Walters, Associate Pathologist
Kermit Miller, Assistant Pathologist, U. S. Forest Service
Harold A. Brischle, Assistant Pathologist

INTRODUCTION

The Kaniksu operation includes the lands of the Kaniksu National Forest and the Priest Lake Timber Protective Association.

The Forest Service program consisted of five camps of 33 men each, financed by regular appropriations; two CCC camps, which used an average of 50 men each on eradication work; and from ERA allotments 75 men were carried on eradication work until July 1, when the number was reduced to 50.

The Bureau of Entomology and Plant Quarantine hauled daily 150 men from Sandpoint and 50 men from Priest River. One 40-man camp and one 20-man camp were financed on a cooperative basis between the Bureau and the State of Idaho. In these camps the State paid all wages and the Bureau furnished equipment, supplies, and transportation. Technical supervision was provided for 75 men on eradication work in one State CCC camp.

ORGANIZATION AND ADMINISTRATION

Administrative headquarters were located at Kalispell Bay. Subsistence supplies and equipment for the individual camps were dispatched from headquarters with trucks, boat and pack stock being used to make deliveries. The accompanying organization chart shows the division of responsibility on the operation.

The first camp opened May 3, the last one, June 20. The first camp closed August 26, and the last one, October 20.

LOCATION AND DESCRIPTION OF AREAS

The regular Forest Service camps were located in the South Fork of Granite Creek, Tillicum Creek, Hughes Meadow, and the Tiger Hill area. The Forest Service ERA camps performed work in Twin Creek and Lakeview Mountain areas. The Bureau camps operated in Pack River, Trestle Creek, and the area west of Olson's mill. The State camps were assigned to the Middle Fork of East River and the North Fork of Indian Creek. One Forest Service CCC camp worked on Lakeview Mountain, and the other in Pass Creek and Gypsy Creek in the Sullivan Lake area. The State CCC camp had crews in Big Creek and in the vicinity of Chase Lake.

The areas ranged from very heavy to light as regards working conditions.

METHODS AND EQUIPMENT

In general, standard methods and equipment were used. Two-man crews were used to some extent but not sufficient data were secured to establish definitely the efficiency of this method of work. Under the guidance of the checking organization the use of the flanking method was extended and a considerable acreage was covered in this way.

Great care was exercised in the selection of the personnel for the Forest Service regular camps and consequently a higher type of laborer was secured, which in turn resulted in an increase in efficiency and output of work.

There was considerable interruption of the work due to fire but in all cases the men were released from the fires as soon as possible. Fire suppression training was given to all the forestry students as well as to other outstanding men. These men were of great aid during the past critical fire season in the detection and suppression of numerous fires.

One principle that was put into practice in the regular camps was that the crews could move along at a more rapid rate of speed than in the past and leave the careful job of minute search to the more highly skilled and faster mop-up men. It is felt that this practice, properly organized, is one means of speeding up the work. Only occasionally can this method be successfully used with WPA labor.

CHECKING

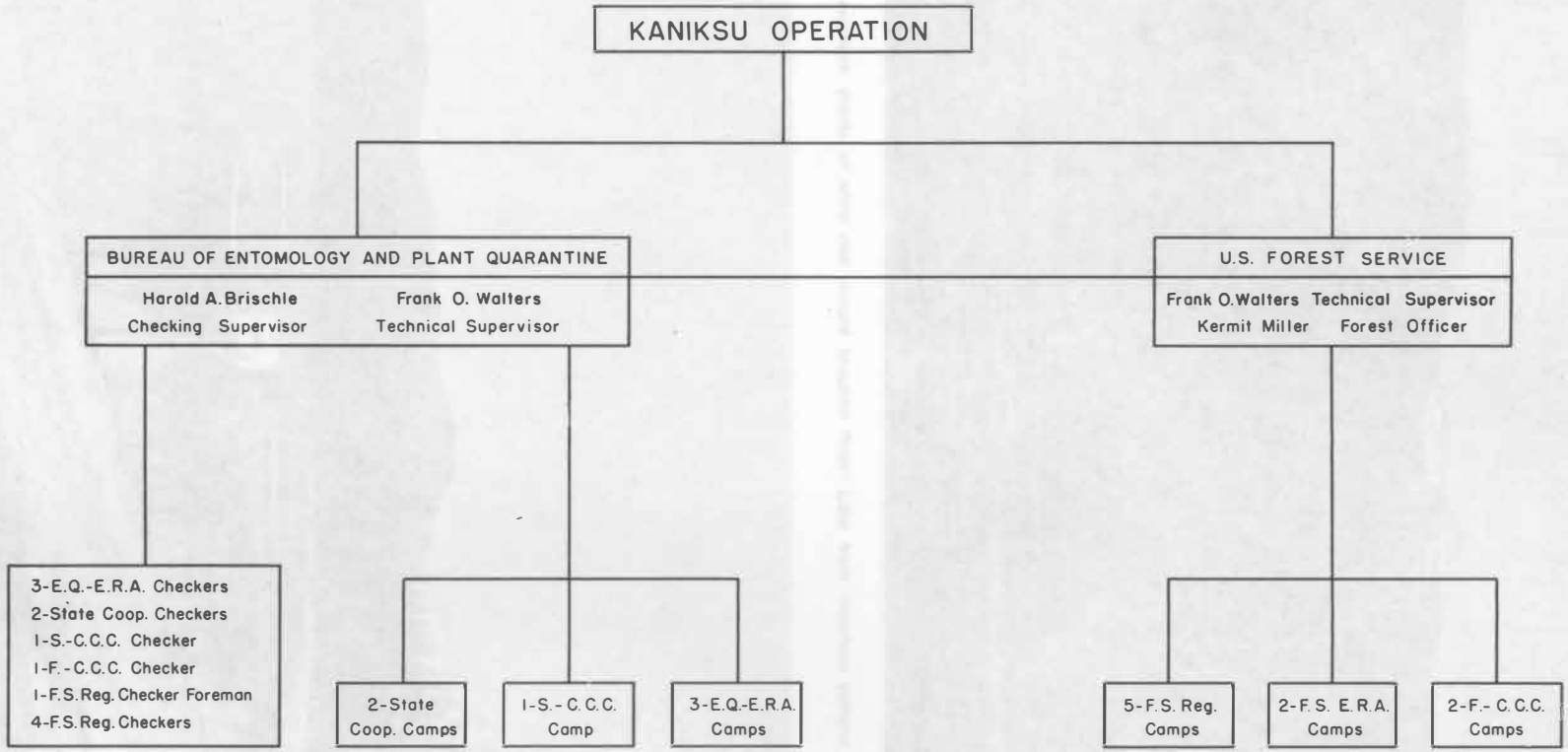
In order to determine the distribution and number of ribes on an area and plan an effective blister rust control program, a system of sampling called checking is employed. Field data obtained by this method play an important part at three stages in the control program.

First, it is employed to determine the ribes conditions on an area prior to eradication, in order to dispatch the proper number of crewmen for efficient work and to eliminate from crew work those areas having no ribes. Secondly, a check is made after eradication crews have covered an area to show whether or not the work conforms to set standards. Thirdly, on sites favorable to ribes germination additional eradication work may be necessary in the future; so a post check is made several years after the first eradication to show the extent to which ribes are regenerating and the urgency of additional control work.

It is essential that men doing checking work be thoroughly reliable and conscientious. Therefore, only men having had at least one year or more of eradication experience are used. These men are carefully trained and are under the constant supervision of the checking supervisor, who inspects their work and data regularly to insure and maintain high caliber performance.

Frequently the checkers encounter areas on which ribes are few and occurring in rather well defined patches. It has been recognized that on

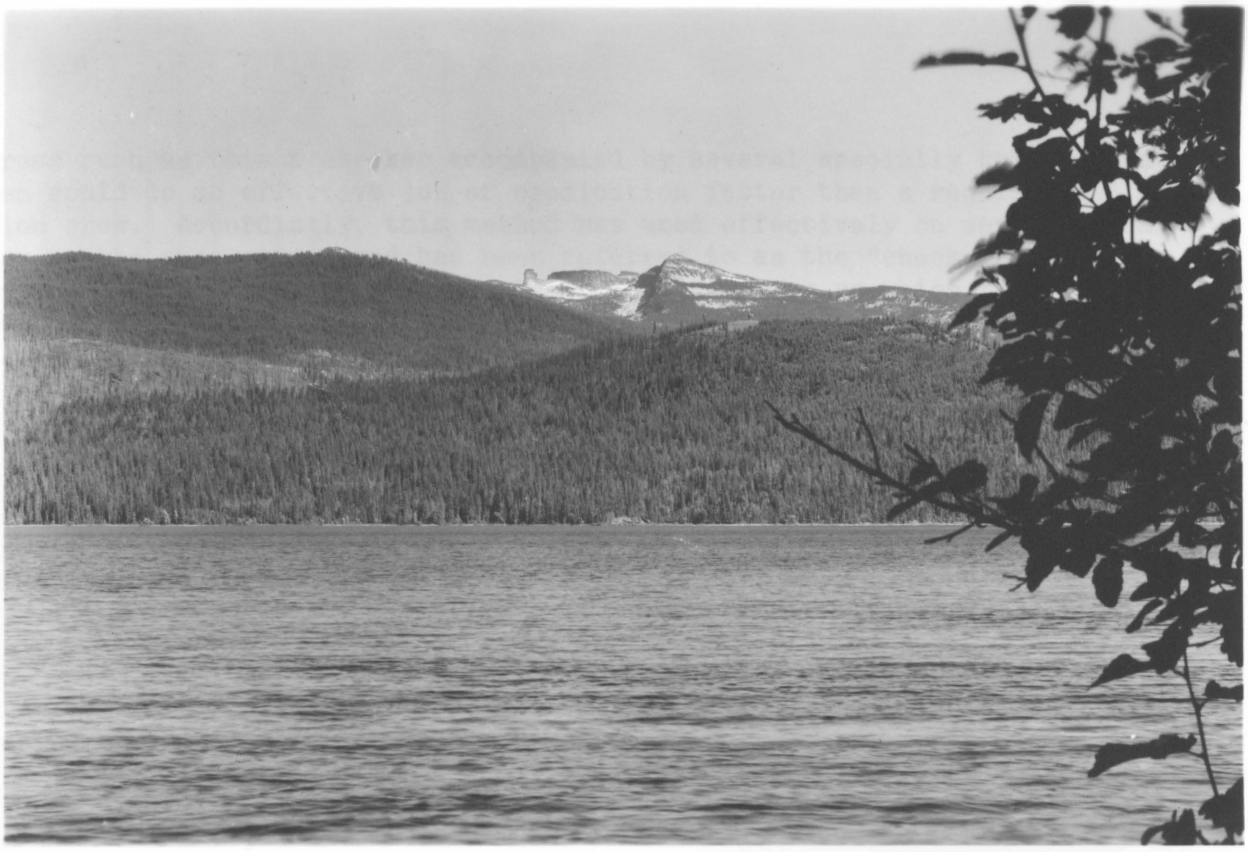
ORGANIZATION CHART



STATE COOP.	E.Q.-E.R.A.	F.S.-REG.	S.-C.C.C.	F.-C.C.C.	F.S.-E.R.A.
Number of Camps - 2	Number of Camps - 4	Number of Camps - 5	Number of Camps - 1	Number of Camps - 5	Number of Camps - 2
Number of Men - 66	Number of Men - 210	Number of Men - 176	Number of Men - 79	Number of Men - 107	Number of Men - 66

Total Number of Men on Blister Rust Work - 704

1940



W 2452. The extensive stands of white pine around beautiful Priest Lake have important esthetic values as well as commercial values.

W 2461 Modes of transportation on the Kaniksu operation are varied. Here may be seen pack stock, transported by boat and barge, loaded with supplies for a remote camp.

areas such as this a checker accompanied by several specially trained fast men could do an effective job of eradication faster than a regular eradication crew. Accordingly, this method was used effectively on several areas during the past season and has been referred to as the "checker flanker method". The use of this method is limited to areas on which ribes are fairly large and not obscured by brush or vegetation.

During the field season, the checking organization inspected 30,174 acres of current season work. Most of these areas were given a four per cent check in upland types and eight per cent, or more, in stream type. For all classes of camps, the check showed four ribes with 11 feet of live stem remaining on upland areas and six ribes with 11 feet of live stem in stream type. The cost of conducting this check was $0.112 per acre for all classes of camps.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperating agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 66,637.49
	ERA	11,643.61
	Total	78,281.10
Bureau of Entomology and Plant Quarantine	Regular	4,900.00
	ERA	62,640.05
	Total	67,540.05
State of Idaho	State of Idaho	10,034.48
Total Expenditures	All Appropriations	$155,855.63

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
KANIKSU OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine			State of Idaho	Total
	Regular	ERA	Total	Regular	ERA	Total		
Salaries, perm. men	$ 2,199.92		$ 2,199.92	$4,900.00		$ 4,900.00		$ 7,099.92
Salaries, temp. men	8,226.37	$ 237.60	8,463.97		$ 5,186.00	5,186.00		13,649.97
Wages, temp. laborers	46,832.01	9,666.10	56,498.11		49,767.12	49,767.12	$10,034.48	116,299.71
Subsistence supplies	7,537.11	1,002.27	8,539.38		2,757.24	2,757.24		11,296.62
Equipment	26.48	28.12	54.60		860.68	860.68		915.28
Trucks and bulldozer	482.96	459.03	941.99					941.99
Travel and transp.	949.84	18.79	968.63		1,771.20	1,771.20		2,739.83
Other supplies	382.90	231.70	614.50		2,297.81	2,297.81		2,912.31
Total	$66,637.49	$11,643.61	$78,281.10	$4,900.00	$62,640.05	$67,540.05	$10,034.48	$155,855.63

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
KANIKSU OPERATION

Program	Number of Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
EQ-ERA	11,851	EQ-ERA	$ 60,882.81	$5.42
		EQ-Reg.	3,400.00	
		Total	64,282.81	
FS-Regular	8,782	FS-Reg.	65,236.94	7.46
		EQ-Reg.	300.00	
		Total	65,536.94	
FS-ERA	2,222	FS-ERA	11,643.61	5.24
State-Coop.	2,111	State	10,034.48	6.01
		EQ-Reg.	900.00	
		EQ-ERA	1,757.24	
		Total	12,691.72	
CCC	4,358	FS-Reg.	800.00	CCC Funds Not Included
		EQ-Reg.	300.00	
		Total	1,100.00	
Pine Disease Survey		FS-Reg.	600.55	
Total Cost of 1940 Program			$155,855.63	

	Forest Service	Bureau
Number of meals served	54,526	14,385
Average cost per meal	$.1849	$.171
Pounds of twine used	3,490	2,308

SUMMARY OF RIBES ERADICATION, 1940
KANIKSU OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	7,889	9,743	256	17,888	18,732	4,413,538	3	9
Dense Reproduction		9		9	24	35	0	0
Open Pole	5,035	1,199		6,234	4,524	624,953	4	15
Dense Pole	1,478	364		1,842	878	50,117	2	11
Open Mature	711	243		954	524	120,192	5	14
Dense Mature	792			792				
Cutover	329	489		818	1,543	188,763	10	22
All Upland	16,234	12,047	256	28,537	26,225	5,397,598	4	11
Stream (Hand)	660	918	59	1,637	3,099	559,086	6	11
All Types	16,894	12,965	315	30,174	29,324	5,956,684	4	11

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	7,889	9,688	3,080,729	1.23	391	3	11
Open Pole	5,035	3,367	501,298	.67	100	4	16
Dense Pole	1,478	546	33,644	.37	23	2	12
Open Mature	711	337	114,424	.47	161	6	18
Dense Mature	792						
Cutover	329	374	44,856	1.14	136	4	8
All Upland	16,234	14,312	3,774,951	.88	233	3	13
Stream (Hand)	660	1,918	420,193	.29	637	5	15
All Types	16,894	16,230	4,195,144	.96	248	4	13

TABLE NO. 3B - SECOND WORKING

Open Reproduction	9,743	8,628	1,320,827	.89	136	4	8
Dense Reproduction	9	24	35	2.67	4		
Open Pole	1,199	1,157	123,655	.96	103	4	11
Dense Pole	364	332	16,473	.91	45	1	4
Open Mature	243	187	5,768	.77	24	2	4
Cutover	489	1,169	143,907	2.39	294	15	32
All Upland	12,047	11,497	1,610,665	95	134	4	9
Stream (Hand)	918	1,145	134,419	1.25	146	6	7
All Types	12,965	12,642	1,745,084	.98	135	4	8

TABLE NO. 3C - THIRD WORKING

Open Reproduction	256	416	11,982	1.63	47	2	3
All Upland	256	416	11,982	1.63	47	2	3
Stream (Hand)	59	36	4,474	.61	76	3	7
All Types	315	452	16,456	1.43	52	2	4

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
						Man Days	Ribes	Bushes	Live Stem
Idaho	First	EQ-ERA	4,456	7,433	750,209	1.67	168		
		FS-ERA	332	217	29,439	.65	89		
		FS-Reg.	796	1,003	348,162	1.26	437		
		State Coop.	4,842	1,874	474,073	.39	98		
		Total	10,426	10,527	1,601,883	1.01	154		
	Second	EQ-ERA	3,485	3,743	232,133	1.07	67		
		FS-ERA	1,556	2,005	106,565	1.29	68		
		FS-Reg.	2,530	869	334,241	.34	132		
		State Coop.	373	237	35,482	.64	95		
		F-CCC	729	1,788	134,411	2.45	184		
		S-CCC	671	1,294	127,057	1.93	189		
		Total	9,344	9,936	969,889	1.06	104		
	Third	EQ-ERA	123	100	5,943	.81	48		
	All Workings	EQ-ERA	8,064	11,276	988,285	1.40	123		
		FS-ERA	1,888	2,222	136,004	1.18	72		
		FS-Reg.	3,326	1,872	682,403	.56	205		
		State Coop.	5,215	2,111	509,555	.40	98		
		F-CCC	729	1,788	134,411	2.45	184		
		S-CCC	671	1,294	127,057	1.93	189		
		Total	19,893	20,563	2,577,715	1.03	130		
Washington	First	FS-Reg.	6,359	5,357	2,555,239	.84	402		
		F-CCC	109	346	38,022	3.17	349		
		Total	6,468	5,703	2,593,261	.88	401		
	Second	EQ-ERA	120	223	61,580	1.86	513		
		FS-Reg.	2,811	1,553	638,172	.55	227		
		F-CCC	690	930	75,443	1.35	109		
		Total	3,621	2,706	775,195	.75	214		
	Third	EQ-ERA	192	352	10,513	1.83	55		
	All Workings	EQ-ERA	312	575	72,093	1.84	231		
		FS-Reg.	9,170	6,910	3,193,411	.75	348		
		F-CCC	799	1,276	113,465	1.60	142		
		Total	10,281	8,761	3,378,969	.85	329		
Idaho and Washington	First	EQ-ERA	4,456	7,433	750,209	1.67	168	4	11
		FS-ERA	332	217	29,439	.65	89	7	47
		FS-Reg.	7,155	6,360	2,903,401	.89	406	3	10
		State Coop	4,842	1,874	474,073	.39	98	5	18
		F-CCC	109	346	38,022	3.17	349	14	50
		Total	16,894	16,230	4,195,144	.96	248	4	13
	Second	EQ-ERA	3,605	3,966	293,713	1.10	81	4	9
		FS-ERA	1,556	2,005	106,565	1.29	68	3	8
		FS-Reg.	5,341	2,422	972,413	.45	182	3	5
		State Coop.	373	237	35,482	.64	95	5	11
		F-CCC	1,419	2,718	209,854	1.92	148	10	13
		S-CCC	671	1,294	127,057	1.93	189	9	22
		Total	12,965	12,642	1,745,084	.98	135	4	8
	Third	EQ-ERA	315	452	16,456	1.43	52	2	4
	All Workings	EQ-ERA	8,376	11,851	1,060,378	1.41	127	4	10
		FS-ERA	1,888	2,222	136,004	1.18	72	3	15
		FS-Reg.	12,496	8,782	3,875,814	.70	310	3	8
		State Coop.	5,215	2,111	509,555	.40	98	5	18
		F-CCC	1,528	3,064	247,876	2.01	162	11	16
		S-CCC	671	1,294	127,057	1.93	189	9	22
		Total	30,174	29,324	5,956,684	.97	197	4	11

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
KANIKSU OPERATION

State	Working	Number of Acres Worked									Total
		By Forest Service			By Bureau of Entomology and Plant Quarantine			Total			
		Forest Service	State	Private	Forest Service	State	Private	Forest Service	State	Private	
Idaho	First	1,048		80	2,511	5,392	1,395	3,559	5,392	1,475	10,426
	Second	4,395		420	1,903	695	1,931	6,298	695	2,351	9,344
	Third				84		39	84		39	123
	Total	5,443		500	4,498	6,087	3,365	9,941	6,087	3,865	19,893
Washington	First	4,738	50	1,680				4,738	50	1,680	6,468
	Second	2,036		1,465	90		30	2,126		1,495	3,621
	Third						192			192	192
	Total	6,774	50	3,145	90		222	6,864	50	3,367	10,281
Total	First	5,786	50	1,760	2,511	5,392	1,395	8,297	5,442	3,155	16,894
	Second	6,431		1,885	1,993	695	1,961	8,424	695	3,846	12,965
	Third				84		231	84		231	315
	Total	12,217	50	3,645	4,588	6,087	3,587	16,805	6,137	7,232	30,174

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
KANIKSU OPERATION

Eradication Type	Average Results for All Areas			
	Acres in Checked Area	Acres Checked	Ribes Per Acre	
			Bushes	Live Stem
Open Reproduction	17,888	671.3	3	9
Dense Reproduction	9	.4	0	0
Open Pole	6,234	180.6	4	15
Dense Pole	1,842	66.9	2	11
Open Mature	954	32.3	5	14
Dense Mature	792			
Cutover	818	29.7	10	22
All Upland	28,537	981.2	4	11
Stream	1,637	205.7	6	11
All Types	30,174	1,186.9	4	11

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Open Reproduction	7,889	866,914	2,213,815		3,080,729
	Open Pole	5,035	236,882	264,416		501,298
	Dense Pole	1,478	32,291	1,353		33,644
	Open Mature	711	99,682	14,742		114,424
	Dense Mature	792				
	Cutover	329	16,742	26,330	1,784	44,856
	All Upland	16,234	1,252,511	2,520,656	1,784	3,774,951
	Stream	660	392,493	26,579	1,121	420,193
	All Types	16,894	1,645,004	2,547,235	2,905	4,195,144
Second	Open Reproduction	9,743	351,737	969,090		1,320,827
	Dense Reproduction	9	35			35
	Open Pole	1,199	61,633	62,022		123,655
	Dense Pole	364	11,666	4,807		16,473
	Open Mature	243	2,478	3,290		5,768
	Cutover	489	32,685	111,080	142	143,907
	All Upland	12,047	460,234	1,150,289	142	1,610,665
	Stream	918	124,037	8,014	2,368	134,419
	All Types	12,965	584,271	1,158,303	2,510	1,745,084
Third	Open Reproduction	256	4,428	7,185	369	11,982
	Stream	59	4,271	203		4,474
	All Types	315	8,699	7,388	369	16,456
All Workings	Open Reproduction	17,888	1,223,079	3,190,090	369	4,413,538
	Dense Reproduction	9	35			35
	Open Pole	6,234	298,515	326,438		624,953
	Dense Pole	1,842	43,957	6,160		50,117
	Open Mature	954	102,160	18,032		120,192
	Dense Mature	792				
	Cutover	818	49,427	137,410	1,926	188,763
	All Upland	28,537	1,717,173	3,678,130	2,295	5,397,598
	Stream	1,637	520,801	34,796	3,489	559,086
	All Types	30,174	2,237,974	3,712,926	5,784	5,956,684

SUMMARY OF RIBES ERADICATION, 1923-1940
KANIKSU OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	134,361	23,359	1,984	159,704	121,250	32,331,551
Dense Reproduction	22,524	2,327		24,851	13,830	1,888,894
Open Pole	98,102	10,706		108,808	40,640	5,659,057
Dense Pole	21,327	2,174	11	23,512	4,704	451,084
Open Mature	109,927	4,147	29	114,103	28,804	5,605,574
Dense Mature	31,047	601		31,648	3,782	433,532
Cutover	7,587	2,052		9,639	8,451	2,463,400
Brush	3,599	596	32	4,227	1,486	364,707
Burn	1,132			1,132	1,354	947,874
Subalpine	1,933	50		1,983	1,032	157,110
Meadow-Field	71	10		81	1	72
All Upland	431,610	46,022	2,056	479,688	225,334	50,302,855
Stream (Hand)	20,494	4,810	274	25,578	44,885	9,149,677
Stream (Slash)	576			576	4,994	288,000
Stream (Machine)	1,030			1,030	7,081	614,076
All Stream	22,100	4,810	274	27,184	56,960	10,051,753
All Types	453,710	50,832	2,330	506,872	282,294	60,354,608

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Ribes
Open Reproduction	134,361	96,362	28,417,687	.72	212
Dense Reproduction	22,524	11,655	1,700,022	.52	75
Open Pole	98,102	35,353	5,231,035	.36	53
Dense Pole	21,327	3,924	402,183	.18	19
Open Mature	109,927	26,430	5,339,049	.24	49
Dense Mature	31,047	3,584	415,459	.12	13
Cutover	7,587	3,779	1,071,116	.50	141
Brush	3,599	1,104	336,107	.31	93
Burn	1,132	1,354	947,874	1.20	837
Subalpine	1,933	1,019	156,522	.53	81
Meadow-Field	71				
All Upland	431,610	184,564	44,017,054	.43	102
Stream (Hand)	20,494	36,565	8,228,330	1.78	401
Stream (Slash)	576	4,994	288,000	8.67	500
Stream (Machine)	1,030	7,081	614,076	6.87	596
All Stream	22,100	48,640	9,130,406	2.20	413
All Types	453,710	233,204	53,147,460	.51	117

TABLE NO. 8B - SECOND WORKING

Open Reproduction	23,359	22,476	3,787,943	.96	162
Dense Reproduction	2,327	2,175	188,872	.93	81
Open Pole	10,706	5,287	428,022	.49	40
Dense Pole	2,174	777	48,876	.36	22
Open Mature	4,147	2,349	266,075	.57	64
Dense Mature	601	198	18,073	.33	30
Cutover	2,052	4,672	1,392,284	2.28	679
Brush	596	347	27,842	.58	47
Subalpine	50	13	588	.26	12
Meadow-Field	10	1	72	.10	7
All Upland	46,022	38,295	6,158,647	.83	134
Stream (Hand)	4,810	7,946	898,432	1.65	187
All Types	50,832	46,241	7,057,079	.91	139

TABLE NO. 8C - THIRD WORKING

Open Reproduction	1,984	2,412	125,921	1.22	63
Dense Pole	11	3	25	.27	2
Open Mature	29	25	450	.86	16
Brush	32	35	758	1.09	24
All Upland	2,056	2,475	127,154	1.20	62
Stream (Hand)	274	374	22,915	1.36	84
All Types	2,330	2,849	150,069	1.22	65

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1940
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
						Man Days	Ribes
Idaho	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	8,850	15,203	2,555,207	1.72	289
		FS-NIRA	72,135	23,866	6,432,376	.33	89
		EQ-ERA	79,577	47,328	8,120,331	.59	102
		FS-ERA	15,853	10,139	1,880,647	.64	119
		Cooperative	111,150	30,929	8,750,877	.28	79
		F-CCC	54,424	36,378	6,379,138	.67	117
		S&P-CCC	112	748	209,356	6.68	1,869
		Total	360,897	171,435	35,394,621	.48	99
	Second	FS-Reg.	4,504	2,455	446,758	.55	99
		FS-NIRA	8,544	2,051	292,658	.24	34
		EQ-ERA	13,207	13,788	2,571,725	1.04	195
		FS-ERA	2,737	2,767	182,793	1.01	67
		Cooperative	4,216	3,252	390,209	.77	93
		F-CCC	4,306	9,510	1,120,286	2.21	260
		S&P-CCC	3,577	3,842	743,055	1.07	208
		Total	41,091	37,665	5,747,484	.92	140
	Third	EQ-ERA	1,814	2,425	132,464	1.34	73
		Cooperative	324	72	7,092	.22	22
		Total	2,138	2,497	139,556	1.17	65
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	13,354	17,658	3,001,965	1.32	225
		FS-NIRA	80,679	25,917	6,725,034	.32	83
		EQ-ERA	94,598	63,541	10,824,520	.67	114
		FS-ERA	18,590	12,906	2,063,440	.69	111
		Cooperative	115,690	34,253	9,148,178	.30	79
		F-CCC	58,730	45,888	7,499,424	.78	128
		S&P-CCC	3,689	4,590	952,411	1.24	258
		Total	404,126	211,597	41,281,661	.52	102
Washington	First	FS-Reg.	8,594	10,080	4,100,764	1.17	477
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	34,417	12,708	3,858,496	.37	112
		EQ-ERA	3,328	5,844	2,190,917	1.76	658
		F-CCC	19,741	21,426	3,254,404	1.09	165
		Total	92,813	61,769	17,752,839	.67	191
	Second	FS-Reg.	3,829	2,238	717,619	.58	187
		EQ-ERA	1,376	1,381	204,383	1.00	149
		FS-ERA	1,949	1,678	154,764	.86	79
		F-CCC	2,587	3,279	232,829	1.27	90
		Total	9,741	8,576	1,309,595	.88	134
	Third	EQ-ERA	192	352	10,513	1.83	55
	All Workings	FS-Reg.	12,423	12,318	4,818,383	.99	388
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	34,417	12,708	3,858,496	.37	112
		EQ-ERA	4,896	7,577	2,405,813	1.55	491
		FS-ERA	1,949	1,678	154,764	.86	79
		F-CCC	22,328	24,705	3,487,233	1.11	156
		Total	102,746	70,697	19,072,947	.69	186
Idaho and Washington	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	17,444	25,283	6,655,971	1.45	382
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	106,552	36,574	10,290,872	.34	97
		EQ-ERA	82,905	53,172	10,311,248	.64	124
		FS-ERA	15,853	10,139	1,880,647	.64	119
		Cooperative	111,150	30,929	8,750,877	.28	79
		F-CCC	74,165	57,804	9,633,542	.78	130
		S&P-CCC	112	748	209,356	6.68	1,869
		Total	453,710	233,204	53,147,460	.51	117
	Second	FS-Reg.	8,333	4,693	1,164,377	.56	140
		FS-NIRA	8,544	2,051	292,658	.24	34
		EQ-ERA	14,583	15,169	2,776,108	1.04	190
		FS-ERA	4,686	4,445	337,557	.95	72
		Cooperative	4,216	3,252	390,209	.77	93
		F-CCC	6,893	12,789	1,353,115	1.86	196
		S&P-CCC	3,577	3,842	743,055	1.07	208
		Total	50,832	46,241	7,057,079	.91	139
	Third	EQ-ERA	2,006	2,777	142,977	1.38	71
		Cooperative	324	72	7,092	.22	22
		Total	2,330	2,849	150,069	1.22	64
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	25,777	29,976	7,820,348	1.16	303
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	115,096	38,625	10,583,530	.34	92
		EQ-ERA	99,494	71,118	13,230,333	.71	133
		FS-ERA	20,539	14,584	2,218,204	.71	108
		Cooperative	115,690	34,253	9,148,178	.30	79
		F-CCC	81,058	70,593	10,986,657	.87	136
		S&P-CCC	3,689	4,590	952,411	1.24	258
		Total	506,872	282,294	60,354,608	.56	119

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1940
KANIKSU OPERATION

State	Working	Number of Acres Worked by Ownership Classes					
		Federal			State	Private	Total
		Forest Service	Public Domain	Total			
Idaho	First	182,594	54	182,648	110,856	67,393	360,897
	Second	21,166		21,166	12,150	7,775	41,091
	Third	84		84	1,975	79	2,138
	All Workings	203,844	54	203,898	124,981	75,247	404,126
Washington	First	56,663		56,663	2,080	34,070	92,813
	Second	6,448		6,448		3,293	9,741
	Third					192	192
	All Workings	63,111		63,111	2,080	37,555	102,746
Idaho and Washington	First	239,257	54	239,311	112,936	101,463	453,710
	Second	27,614		27,614	12,150	11,068	50,832
	Third	84		84	1,975	271	2,330
	All Workings	266,955	54	267,009	127,061	112,802	506,872

TABLE NO. 11

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1940
KANIKSU OPERATION

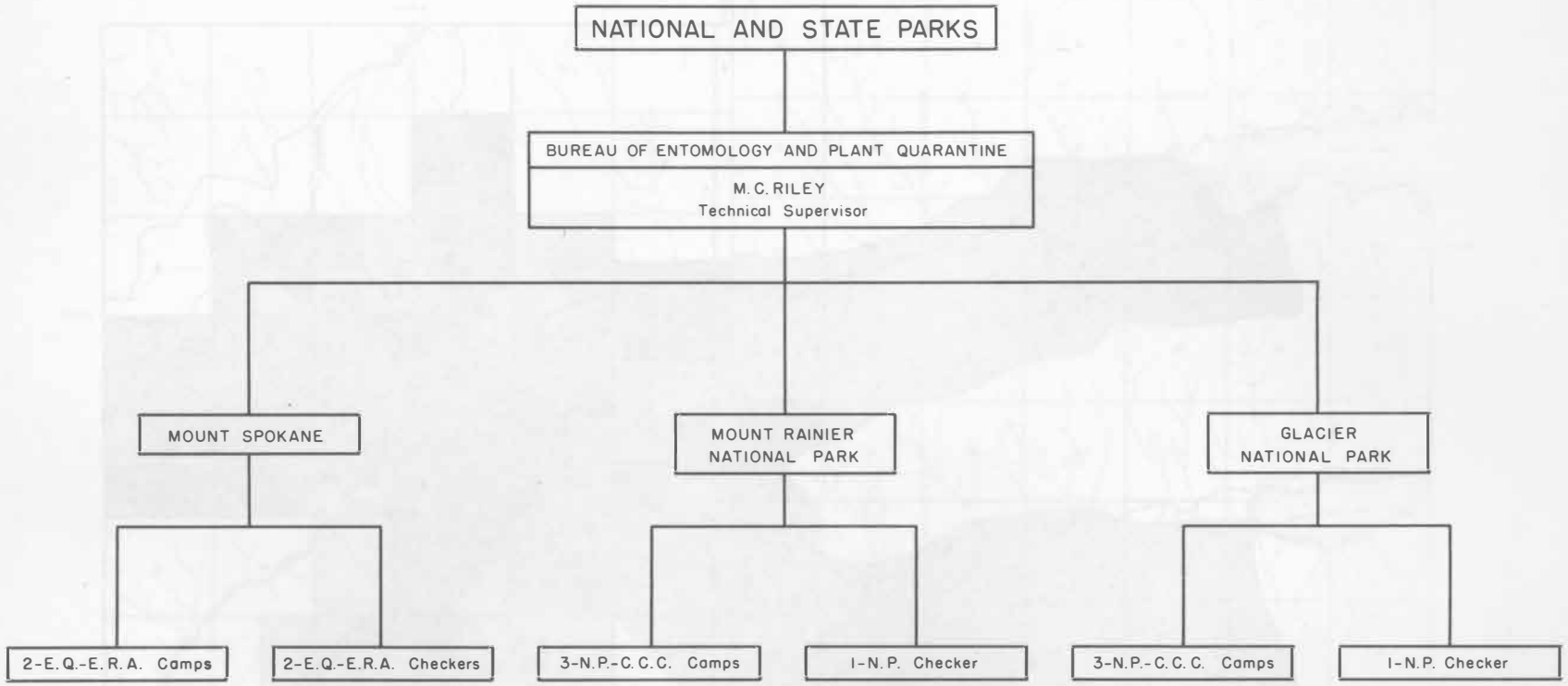
State	Ownership Class	Number of Acres		
		Worked	Unworked	Total
Idaho	Forest Service	182,594	72,291	254,885
	Public Domain	54	506	560
	Subtotal Federal	182,648	72,797	255,445
	State	110,856	17,614	128,470
	Private	67,393	50,317	117,710
	Total	360,897	140,728	501,625
Washington	Forest Service	56,663	35,227	91,890
	State	2,080	2,030	4,110
	Private	34,070	11,575	45,645
	Total	92,813	48,832	141,645
Idaho and Washington	Forest Service	239,257	107,518	346,775
	Public Domain	54	506	560
	Subtotal Federal	239,311	108,024	347,335
	State	112,936	19,644	132,580
	Private	101,463	61,892	163,355
	Total	453,710	189,560	643,270

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1923-1940
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Open Reproduction	134,361	7,712,665	20,543,969	158,106	2,947		28,417,687
	Dense Reproduction	22,524	1,234,765	398,962	66,295			1,700,022
	Open Pole	98,102	2,415,725	2,604,157	186,047	21,192	3,914	5,231,035
	Dense Pole	21,327	268,016	111,257	22,388	522		402,183
	Open Mature	109,927	3,694,817	1,519,483	122,722		2,027	5,339,049
	Dense Mature	31,047	295,808	87,912	31,739			415,459
	Cutover	7,587	486,080	540,032	45,004			1,071,116
	Brush	3,599	68,387	203,158	64,562			336,107
	Burn	1,132	153,516	790,402	3,956			947,874
	Subalpine	1,933	116,392	40,111	19			156,522
	Meadow-Field	71						
	All Upland	431,610	16,446,171	26,839,443	700,838	24,661	5,941	44,017,054
	Stream	22,100	4,836,066	419,813	3,854,943		19,584	9,130,406
	All Types	453,710	21,282,237	27,259,256	4,555,781	24,661	25,525	53,147,460
Second	Open Reproduction	23,359	1,005,931	2,759,927	22,085			3,787,943
	Dense Reproduction	2,327	133,367	53,987	1,518			188,872
	Open Pole	10,706	211,080	209,095	7,847			428,022
	Dense Pole	2,174	38,839	7,561	2,476			48,876
	Open Mature	4,147	132,466	130,393	3,216			266,075
	Dense Mature	601	13,802	3,613	658			18,073
	Cutover	2,052	333,606	1,050,317	8,361			1,392,284
	Brush	596	15,641	11,326	875			27,842
	Subalpine	50	461	127				588
	Meadow-Field	10	72					72
	All Upland	46,022	1,885,265	4,226,346	47,036			6,158,647
	Stream	4,810	459,595	42,981	395,856			898,432
	All Types	50,832	2,344,860	4,269,327	442,892			7,057,079
Third	Open Reproduction	1,984	47,127	78,425	369			125,921
	Dense Pole	11	20	5				25
	Open Mature	29	150	300				450
	Brush	32	158	600				758
	All Upland	2,056	47,455	79,330	369			127,154
	Stream	274	20,044	2,871				22,915
	All Types	2,330	67,499	82,201	369			150,069
All Workings	Open Reproduction	159,704	8,765,723	23,382,321	180,560	2,947		32,331,551
	Dense Reproduction	24,851	1,368,132	452,949	67,813			1,888,894
	Open Pole	108,808	2,626,805	2,813,252	193,894	21,192	3,914	5,659,057
	Dense Pole	23,512	306,875	118,823	24,864	522		451,084
	Open Mature	114,103	3,827,433	1,650,176	125,938		2,027	5,605,574
	Dense Mature	31,648	309,610	91,525	32,397			433,532
	Cutover	9,639	819,686	1,590,349	53,365			2,463,400
	Brush	4,227	84,186	215,084	65,437			364,707
	Burn	1,132	153,516	790,402	3,956			947,874
	Subalpine	1,983	116,853	40,238	19			157,110
	Meadow-Field	81	72					72
	All Upland	479,688	18,378,891	31,145,119	748,243	24,661	5,941	50,302,855
	Stream	27,184	5,315,705	465,665	4,250,799		19,584	10,051,753
	All Types	506,872	23,694,596	31,610,784	4,999,042	24,661	25,525	60,354,608

ORGANIZATION CHART



E.Q.-E.R.A.
Number of Camps - 2
Number of Men - 130

N.P.-C.C.C.
Number of Camps - 3
Number of Men - 95

N.P.-C.C.C.
Number of Camps - 3
Number of Men - 90

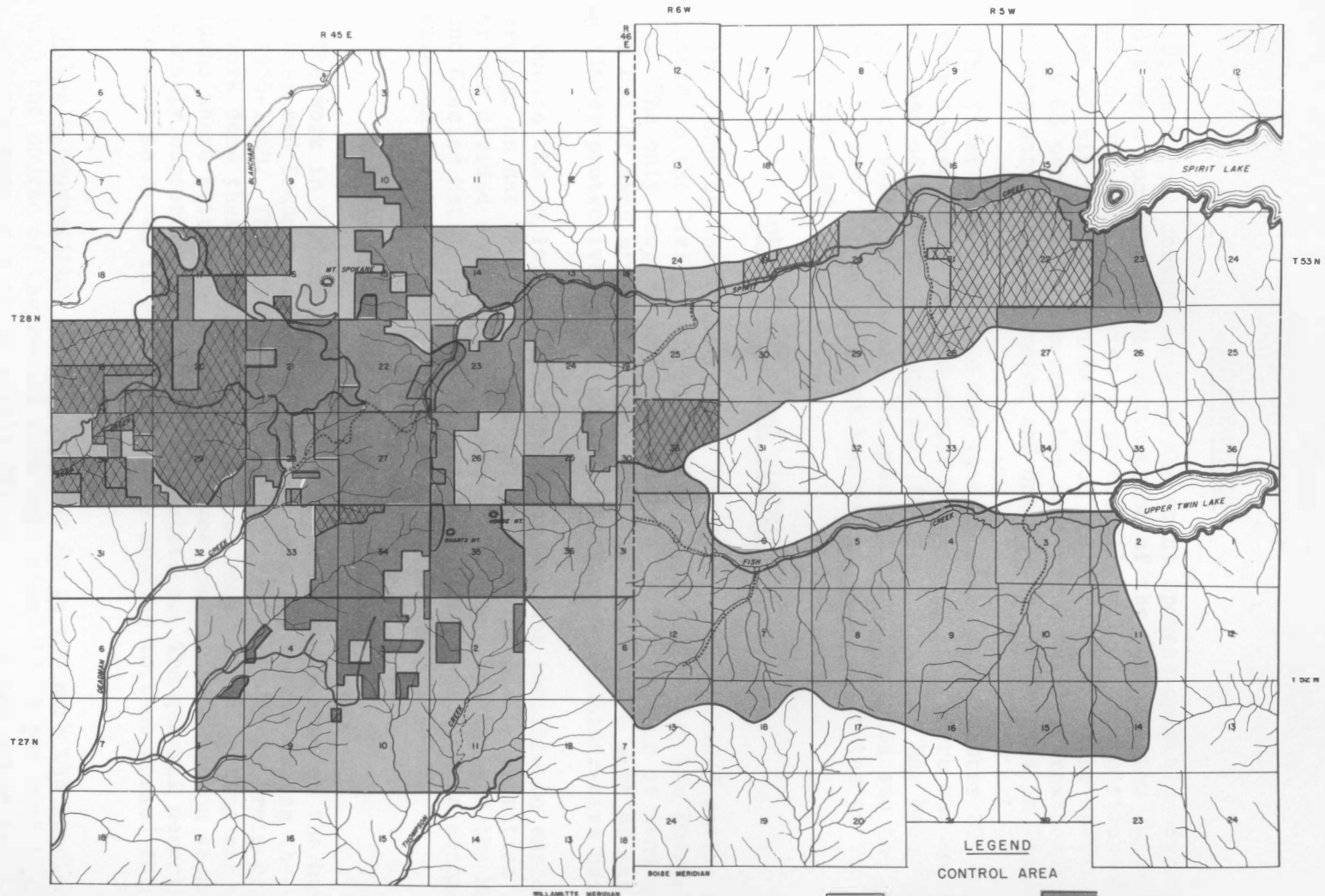
Total Number of Men on Blister Rust Work - 315

MT. SPOKANE OPERATION

BLISTER RUST CONTROL WORKING AREA

SCALE

WILLAMETTE AND BOISE MERIDIANS



ANNUAL REPORT 1940
M C RILEY

RIBES ERADICATION, MOUNT SPOKANE OPERATION, 1940

By
M. C. Riley
Associate Forester

INTRODUCTION

Blister rust control work on the Mount Spokane operation during the 1940 field season consisted of a continuation of the work started in 1935. Initial working has been completed on practically all of that portion of the control area within the state of Washington while for the entire operation approximately 65 per cent of the area has been given initial treatment. One 45-man ERA camp worked in Washington and one 90-man camp worked in Idaho.

The first camp opened on May 1, and closed on September 30, and the last camp opened on May 8, and closed on October 15. There was considerably less loss of time due to turnover, fire and rain than has been experienced in previous years. This made it possible to slightly exceed the acreage quota established at the start of the season even though the entire man-day quota was not used.

ORGANIZATION AND ADMINISTRATION

The camps on the Mount Spokane operation were financed entirely by funds allotted to the Division of Plant Disease Control under the Emergency Relief Act. The only cooperators were owners of small parcels of land who donated the use of camp sites, since none of the lands are a part of any co-operating timber protective agency or National Forest administrative unit.

Due to the employment limitations it was not possible to employ a unit supervisor as has been done previously. The time of the operation supervisor was divided about equally between the Mount Spokane and the Mount Rainier and Glacier National Park operations as illustrated in the accompanying organization chart.

LOCATION AND DESCRIPTION OF AREA

The work in Washington centered around Mount Spokane on the headwaters of Deep and Deadman Creeks on areas originally worked during the period of 1935-1938. The work in Idaho was on the Spirit Creek drainage adjoining work done there in 1939. In addition some second working was done in Idaho where white pine reproduction was heavily infected on an area which originally supported a heavy ribes population. The general description of the area as given in previous reports applies to that worked this year.

Ribes viscosissimum, R. lacustre and R. inerme were the species found during the course of the season with approximately 10 per cent being R. inerme and the remainder about evenly divided between the other two species. This is the first time that R. viscosissimum has not been defi-

nitely predominating and is due to the fact that in the Idaho area the work is approaching the limits of the control area and as the white pine diminishes the R. lacustre increases.

The infection picture has not changed appreciably during the past year. Strips run by the pine disease survey crew and examinations made during the course of ribes eradication revealed a small number of new spot infections but the general distribution of the rust was not enlarged by these findings and no new large infection centers were found.

All classes of working and ribes conditions were encountered although in general neither was as severe as in past seasons. Where first working was performed some ribes-free area was found and the second and third working found fewer ribes than has been the case in former years. In some of the open pole type it is apparent that the disturbance caused by eradicators walking over the ground has encouraged ribes germination although as the stand becomes closed these bushes will be suppressed.

METHODS AND EQUIPMENT

As in previous years, all eradication was performed by the hand pulling method. It was the constant aim of all concerned to employ any new idea or modification of usual methods in order to effect any reduction in costs or increased efficiency. Special training was given to rework crews and selected personnel was used in training labor replacements. The practice of laying string lines in advance of crews was used wherever possible although it was not feasible to do this on some of the areas of second and third working.

CHECKING

Checking work was conducted on the basis of a four per cent sample to give the eradication forces immediate and detailed information on the areas. All areas worked were first given an advance survey in order to establish type lines, show ribes population and working conditions. Whenever possible the checkers assisted the camp bosses in laying out crew divisions, assisting with rework areas and helping supervise regular eradication work.

A total of 4,169 acres was covered by regular check. Some of the late season work was not checked because it was felt that a complete eradication had not been secured. During the course of the season approximately 4,650 acres were covered on post check and, aside from worked areas, approximately 1,150 acres were covered by an advance check.

On the basis of time spent on activities directly connected with checking, the cost of regular check was $0.12 per acre, that of advance check was $0.07 per acre and for post check the cost was $0.11 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
MOUNT SPOKANE OPERATION

Cooperating Agency	Appropriation	Amount	
Bureau of Entomology and Plant Quarantine	Regular		$ 2,252.00
	ERA	Idaho $24,543.61 Wash. 13,835.37	38,378.98
	Total		40,630.98
Total Expenditures	All Appropriations		$40, 6398

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
MOUNT SPOKANE OPERATION

Item	Bureau of Entomology and Plant Quarantine		
	Regular	ERA	Total
Salaries, permanent men	$2,200.00		$ 2,200.00
Salaries, temporary men		$ 4,308.94	4,308.94
Wages, temporary laborers	52.00	28,017.48	28,069.48
Subsistence supplies		4,612.17	4,612.17
Equipment		251.66	251.66
Travel and transportation		584.83	584.83
Other Expenses		603.90	603.90
Total	$2,252.00	$38,378.98	$40,630.98

Effective 8-hour man day cost $5.97
Number meals served 35,021 - Average cost per meal $0.147
Pounds of twine 1,121

SUMMARY OF RIBES ERADICATION, 1940
MOUNT SPOKANE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	588	737	370	1,695	3,314	563,100	1.9	3.4
Open Pole	598	770	1,133	2,501	2,800	413,613	2.3	3.3
Dense Pole	131	72	11	214	61	5,732	.4	.7
Open Mature		49		49	64	7,427	2.5	6.5
Brush			95	95	47	1,357	.3	.3
All Upland	1,317	1,628	1,609	4,554	6,286	991,229	2.0	3.2
Stream (Hand)	49	8		57	522	137,997	4.0	8.0
All Types	1,366	1,636	1,609	4,611	6,808	1,129,226	2.0	3.2

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	588	2,122	387,581	3.61	659	1.5	5.2
Open Pole	598	1,300	241,707	2.17	404	2.8	8.4
Dense Pole	131	14	1,427	.11	11		
All Upland	1,317	3,436	630,715	2.61	479	1.9	6.0
Stream (Hand)	49	506	137,177	10.33	2,800	4.7	9.4
All Types	1,366	3,942	767,892	2.89	562	2.0	6.1

TABLE NO. 3B - SECOND WORKING

Open Reproduction	737	904	92,844	1.23	126	2.0	3.0
Open Pole	770	705	93,205	.92	121	4.1	3.6
Dense Pole	72	37	3,919	.51	54	.7	1.7
Open Mature	49	64	7,427	1.31	152	2.5	6.5
All Upland	1,628	1,710	197,395	1.05	121	2.9	3.3
Stream (Hand)	8	16	820	2.00	103		
All Types	1,636	1,726	198,215	1.06	121	2.9	3.3

TABLE NO. 3C - THIRD WORKING

Open Reproduction	370	288	82,675	.78	223	2.3	.6
Open Pole	1,133	795	78,701	.70	69	.9	.9
Dense Pole	11	10	386	.91	35	2.5	2.5
Brush	95	47	1,357	.50	14	.3	.3
All Types	1,609	1,140	163,119	.71	101	1.2	.8

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
MOUNT SPOKANE OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
						Man Days	Ribes	Bushes	Live Stem
Idaho	First	EQ-ERA	1,366	3,942	767,892	2.89	562	2.0	6.1
	Second	EQ-ERA	535	708	75,761	1.32	142	.5	3.2
	All Workings	EQ-ERA	1,901	4,650	843,653	2.45	444	1.6	5.4
Washington	Second	EQ-ERA	1,101	1,018	122,454	.92	111	3.8	3.4
	Third	EQ-ERA	1,609	1,140	163,119	.71	101	1.2	.8
	All Workings	EQ-ERA	2,710	2,158	285,573	.80	105	2.3	1.9
Idaho and Washington	First	EQ-ERA	1,366	3,942	767,892	2.89	562	2.0	6.1
	Second	EQ-ERA	1,636	1,726	198,215	1.06	121	2.9	3.3
	Third	EQ-ERA	1,609	1,140	163,119	.71	101	1.2	.8
	All Workings	EQ-ERA	4,611	6,808	1,129,226	1.48	245	2.0	3.2

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
MOUNT SPOKANE OPERATION

State	Working	Number of Acres Worked by Bureau of Entomology and Plant Quarantine					
		Federal					
		Forest Service	Public Domain	Total	State	Private	Total
Idaho	First	190	90	280	91	995	1,366
	Second				409	126	535
	Total	190	90	280	500	1,121	1,901
Washington	Second				992	109	1,101
	Third				920	689	1,609
	Total				1,912	798	2,710
Total	First	190	90	280	91	995	1,366
	Second				1,401	235	1,636
	Third				920	689	1,609
	Total	190	90	280	2,412	1,919	4,611

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
MOUNT SPOKANE OPERATION

Eradication Type	Average Results for all Areas			
	Acres in Checked Area	Acres Checked	Ribes per Acre	
			Bushes	Live Stem
Open Reproduction	1,510	60.3	1.9	3.4
Open Pole	2,261	90.4	2.3	3.3
Dense Pole	203	8.1	.4	.7
Open Mature	49	2.0	2.5	6.5
Brush	95	3.8	.3	.3
All Upland	4,118	164.6	2.0	3.2
Stream (Hand)	51	2.0	4.0	8.0
All Types	4,169	166.6	2.0	3.2

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
MOUNT SPOKANE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Open Reproduction	588	206,195	181,386		387,581
	Open Pole	598	143,302	98,405		241,707
	Dense Pole	131	579	848		1,427
	All Upland	1,317	350,076	280,639		630,715
	Stream	49	18,444	589	118,144	137,177
	All Types	1,366	368,520	281,228	118,144	767,892
Second	Open Reproduction	737	38,952	53,892		92,844
	Open Pole	770	37,238	55,967		93,205
	Dense Pole	72	705	3,214		3,919
	Open Mature	49	709	6,718		7,427
	All Upland	1,628	77,604	119,791		197,395
	Stream	8	757	63		820
	All Types	1,636	78,361	119,854		198,215
Third	Open Reproduction	370	18,908	63,767		82,675
	Open Pole	1,133	36,549	42,152		78,701
	Dense Pole	11	154	232		386
	Brush	95	379	978		1,357
	All Types	1,609	55,990	107,129		163,119
All Workings	Open Reproduction	1,695	264,055	299,045		563,100
	Open Pole	2,501	217,089	196,524		413,613
	Dense Pole	214	1,438	4,294		5,732
	Open Mature	49	709	6,718		7,427
	Brush	95	379	978		1,357
	All Upland	4,554	483,670	507,559		991,229
	Stream	57	19,201	652	118,144	137,997
	All Types	4,611	502,871	508,211	118,144	1,129,226

SUMMARY OF RIBES ERADICATION, 1935-1940
MOUNT SPOKANE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	8,032	3,817	1,358	13,207	28,655	8,336,692
Dense Reproduction	376	215	69	660	952	260,655
Open Pole	8,932	3,920	1,612	14,464	15,751	3,858,418
Dense Pole	754	231	11	996	463	75,619
Open Mature	1,076	727	131	1,934	3,546	730,656
Dense Mature	735	102		837	185	34,017
Cutover	526	760	186	1,472	2,015	972,489
Brush	1,924	601	255	2,780	3,021	394,391
Subalpine	515	181	88	784	502	100,944
All Upland	22,870	10,554	3,710	37,134	55,090	14,763,881
Stream (Hand)	507	222		729	3,334	1,049,558
All Types	23,377	10,776	3,710	37,863	58,424	15,813,439

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Open Reproduction	8,032	23,220	7,196,194	2.89	896
Dense Reproduction	376	592	170,078	1.57	452
Open Pole	8,932	11,407	3,114,515	1.28	349
Dense Pole	754	331	59,815	.44	79
Open Mature	1,076	2,667	542,489	2.48	504
Dense Mature	735	165	33,155	.22	45
Cutover	526	710	236,846	1.35	450
Brush	1,924	1,923	289,058	1.00	150
Subalpine	515	334	85,746	.65	166
All Upland	22,870	41,349	11,727,896	1.81	513
Stream (Hand)	507	2,962	990,922	5.84	1,955
All Types	23,377	44,311	12,718,818	1.90	544

TABLE NO. 8B - SECOND WORKING

Open Reproduction	3,817	4,295	820,982	1.13	215
Dense Reproduction	215	290	61,681	1.35	287
Open Pole	3,920	3,290	593,085	.84	151
Dense Pole	231	122	15,418	.53	67
Open Mature	727	770	161,095	1.06	222
Dense Mature	102	20	862	.20	9
Cutover	760	1,092	669,650	1.44	881
Brush	601	947	88,180	1.58	147
Subalpine	181	129	9,850	.71	54
All Upland	10,554	10,955	2,420,803	1.04	229
Stream (Hand)	222	372	58,636	1.68	264
All Types	10,776	11,327	2,479,439	1.05	230

TABLE NO. 8C - THIRD WORKING

Open Reproduction	1,358	1,140	319,516	.84	235
Dense Reproduction	69	70	28,896	1.01	419
Open Pole	1,612	1,054	150,818	.65	94
Dense Pole	11	10	386	.91	35
Open Mature	131	109	27,072	.83	207
Cutover	186	213	65,993	1.15	355
Brush	255	151	17,153	.59	67
Subalpine	88	39	5,348	.44	61
All Types	3,710	2,786	615,182	.75	166

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1935-1940
MOUNT SPOKANE OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
						Man Days	Ribes
Idaho	First	EQ-ERA	5,282	14,974	4,835,292	2.83	915
	Second	EQ-ERA	535	708	75,761	1.32	142
	All Workings	EQ-ERA	5,817	15,682	4,911,053	2.70	844
Washington	First	EQ-ERA	18,095	29,337	7,883,526	1.62	436
	Second	EQ-ERA	10,241	10,619	2,403,678	1.04	235
	Third	EQ-ERA	3,710	2,786	615,182	.75	166
	All Workings	EQ-ERA	32,046	42,742	10,902,386	1.33	340
Idaho and Washington	First	EQ-ERA	23,377	44,311	12,718,818	1.90	544
	Second	EQ-ERA	10,776	11,327	2,479,439	1.05	230
	Third	EQ-ERA	3,710	2,786	615,182	.75	166
	All Workings	EQ-ERA	37,863	58,424	15,813,439	1.54	418

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1935-1940
MOUNT SPOKANE OPERATION

State	Working	Number of Acres Worked by Ownership Classes					
		Federal			State	Private	Total
		Forest Service	Public Domain	Total			
Idaho	First	310	170	480	1,258	3,544	5,282
	Second				409	126	535
	Total	310	170	480	1,667	3,670	5,817
Washington	First		315	315	4,752	13,028	18,095
	Second		60	60	3,935	6,246	10,241
	Third				2,114	1,596	3,710
	Total		375	375	10,801	20,870	32,046
Total	First	310	485	795	6,010	16,572	23,377
	Second		60	60	4,344	6,372	10,776
	Third				2,114	1,596	3,710
	Total	310	545	855	12,468	24,540	37,863

TABLE NO. 11

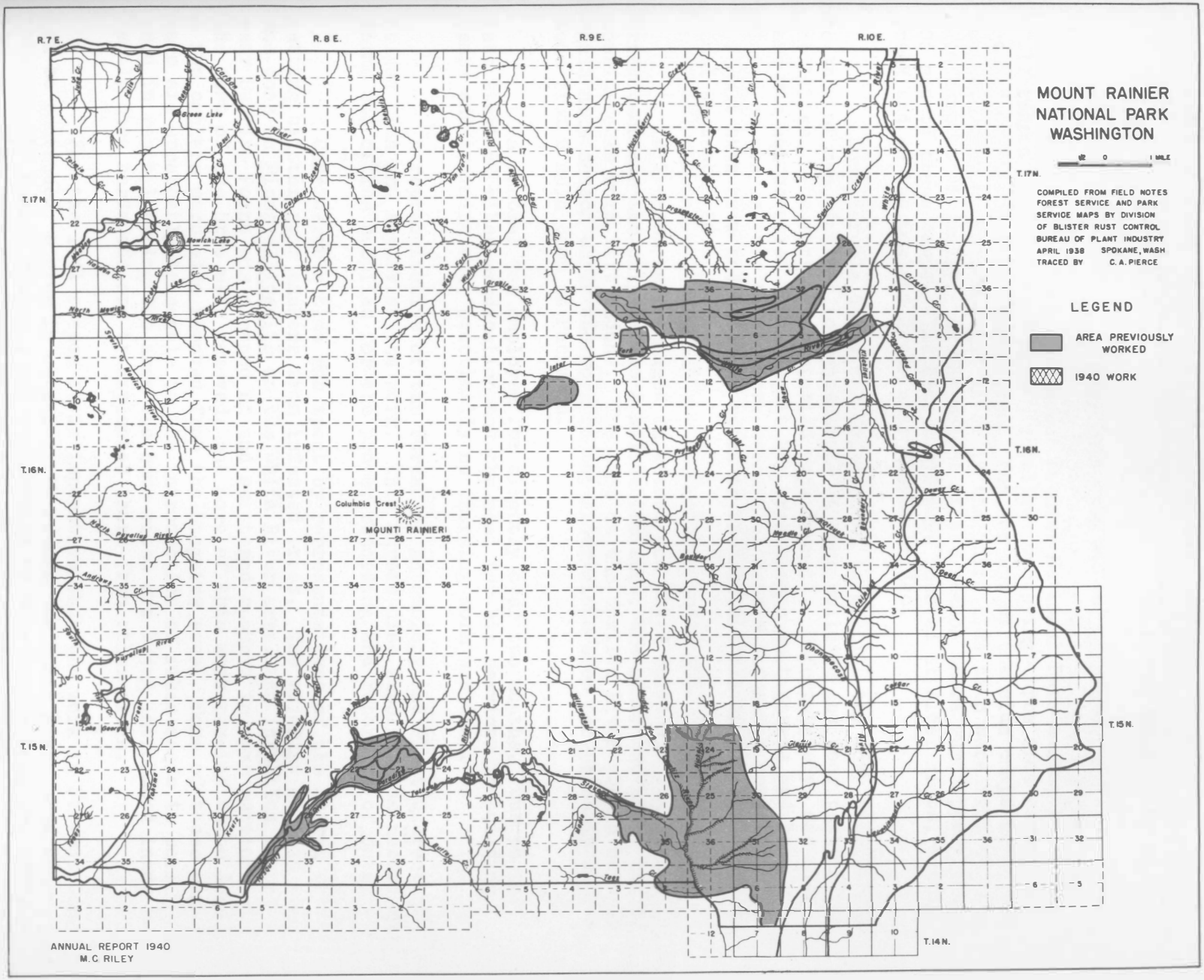
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1935-1940
MOUNT SPOKANE OPERATION

State	Ownership Class	Number of Acres		
		Worked	Unworked	Total
Idaho	Forest Service	310	80	390
	Public Domain	170	255	425
	Subtotal Federal	480	335	815
	State	1,258	467	1,725
	Private	3,544	9,426	12,970
	Total	5,282	10,228	15,510
Washington	Public Domain	315		315
	State	4,752	988	5,740
	Private	13,028	367	13,395
	Total	18,095	1,355	19,450
Total	Forest Service	310	80	390
	Public Domain	485	255	740
	Subtotal Federal	795	335	1,130
	State	6,010	1,455	7,465
	Private	16,572	9,793	26,365
	Total	23,377	11,583	34,960

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1935-1940
MOUNT SPOKANE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Open Reproduction	8,032	2,185,192	4,998,337	12,665	7,196,194
	Dense Reproduction	376	145,551	24,527		170,078
	Open Pole	8,932	1,503,900	1,610,615		3,114,515
	Dense Pole	754	34,973	24,842		59,815
	Open Mature	1,076	259,455	283,034		542,489
	Dense Mature	735	11,281	21,874		33,155
	Cutover	526	136,659	100,187		236,846
	Brush	1,924	85,890	203,168		289,058
	Subalpine	515	46,423	39,323		85,746
	All Upland	22,870	4,409,324	7,305,907	12,665	11,727,896
	Stream	507	690,118	67,807	232,997	990,922
	All Types	23,377	5,099,442	7,373,714	245,662	12,718,818
Second	Open Reproduction	3,817	235,399	585,583		820,982
	Dense Reproduction	215	52,484	9,197		61,681
	Open Pole	3,920	244,086	348,999		593,085
	Dense Pole	231	6,476	8,942		15,418
	Open Mature	727	48,455	112,640		161,095
	Dense Mature	102	463	399		862
	Cutover	760	340,267	329,383		669,650
	Brush	601	40,465	47,715		88,180
	Subalpine	181	4,970	4,880		9,850
	All Upland	10,554	973,065	1,447,738		2,420,803
	Stream	222	55,319	3,317		58,636
	All Types	10,776	1,028,384	1,451,055		2,479,439
Third	Open Reproduction	1,358	142,121	177,395		319,516
	Dense Reproduction	69	23,526	5,370		28,896
	Open Pole	1,612	66,963	83,855		150,818
	Dense Pole	11	154	232		386
	Open Mature	131	8,736	18,336		27,072
	Cutover	186	49,466	16,527		65,993
	Brush	255	4,757	12,396		17,153
	Subalpine	88	2,510	2,838		5,348
	All Types	3,710	298,233	316,949		615,182
All Workings	Open Reproduction	13,207	2,562,712	5,761,315	12,665	8,336,692
	Dense Reproduction	660	221,561	39,094		260,655
	Open Pole	14,464	1,814,949	2,043,469		3,858,418
	Dense Pole	996	41,603	34,016		75,619
	Open Mature	1,934	316,646	414,010		730,656
	Dense Mature	837	11,744	22,273		34,017
	Cutover	1,472	526,392	446,097		972,489
	Brush	2,780	131,112	263,279		394,391
	Subalpine	784	53,903	47,041		100,944
	All Upland	37,134	5,680,622	9,070,594	12,665	14,763,881
	Stream	729	745,437	71,124	232,997	1,049,558
	All Types	37,863	6,426,059	9,141,718	245,662	15,813,439


MOUNT RAINIER
NATIONAL PARK
WASHINGTON
½ 0 1 MILE
COMPILED FROM FIELD NOTES
FOREST SERVICE AND PARK
SERVICE MAPS BY DIVISION
OF BLISTER RUST CONTROL
BUREAU OF PLANT INDUSTRY
APRIL 1938 SPOKANE, WASH
TRACED BY C. A. PIERCE
LEGEND
AREA PREVIOUSLY WORKED
1940 WORK
R.7 E.
R.8 E.
R.9 E.
R.10 E.
T.17 N.
T.16 N.
T.15 N.
T.14 N.
MOUNT RAINIER
Columbia Crest
ANNUAL REPORT 1940
M.C. RILEY

WHITE PINE BLISTER RUST CONTROL
MOUNT RAINIER NATIONAL PARK, 1940.

By
M. C. Riley
Associate Forester

Ribes eradication on Mount Rainier National Park during the 1940 field season was performed by CCC enrollees occupying three side camps, all located on the Stevens Canyon area. Men for two of the side camps were from the main camp at Packwood and those in the third side camp were from the new main camp at Nisqually. At the height of the season there were approximately 105 men in these camps. The side camps were located at Alder Flats, Nickle Creek and on the Cowlitz River near Canyon Bridge.

Considerable delay was experienced in getting the work started due to lack of men, failure to concentrate on camp building and poor packing facilities. The first camp started work June 17. Unfortunately, one side camp was not occupied until August 20, even though much stress had been placed on the urgency of the work because of severe infection conditions. As a result this crew had only one month in the field. All camps closed on about September 20.

All crews were engaged in second and third working. The Nickle Creek camp was the only one to complete its area, the other two camps having considerable work left undone. The camp on the Cowlitz River should be used again next season while the work on the Alder Flats area can probably be done from a main camp at Packwood.

A checker was employed for slightly over two months. Due to the late start of ribes eradication and the need for his services in building camps and training men, practically no checking work was done.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and supervise the work. This Bureau also supplied the necessary forms and office supplies for the proper recording and reporting of data.

Considerable time was spent by representatives of the Bureau in cutting blister rust cankers from infected trees. The majority of this work was done on Pinus albicaulis on the White River area. An infection center near Sunrise Point was cleaned up and scattered cankers in some portions of the rest of the area were removed, but more of this work remains to be done. A few cankers were also removed from the Longmire area. Some of these cankers are apparently traceable to the introduction of ribes seeds in soil used in rehabilitating the area and some ribes are being introduced inadvertently when hardwoods are transplanted there from other areas.

For the 1941 season it is imperative that the work in Stevens Canyon be continued, a crew is necessary to rework the White River area and complete the canker removal, and work should be done on the Longmire area, the amount depending upon the results of an early season check.

In directing the work on Mount Rainier National Park during the 1940 field season, the Bureau of Entomology and Plant Quarantine expended a total of $819.38 for travel, expenses and supervisory time.

The following tables show the results of the ribes eradication work for the 1940 season and cumulative results of all work done to date:

TABLE NO. 1

SUMMARY OF RIBES ERADICATION, 1940
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes sanguineum	Total Ribes	Per Acre Basis: Man Days	Per Acre Basis: Ribes
Stevens Canyon	Second	Stream	274	842	7,924	95	24,648	601	33,268	3.07	121
	Third	Stream	183	443	712		21,651		22,363	2.42	122
	Total	Stream	457	1,285	8,636	.95	46,299	601	55,631	2.81	122

TABLE NO. 2

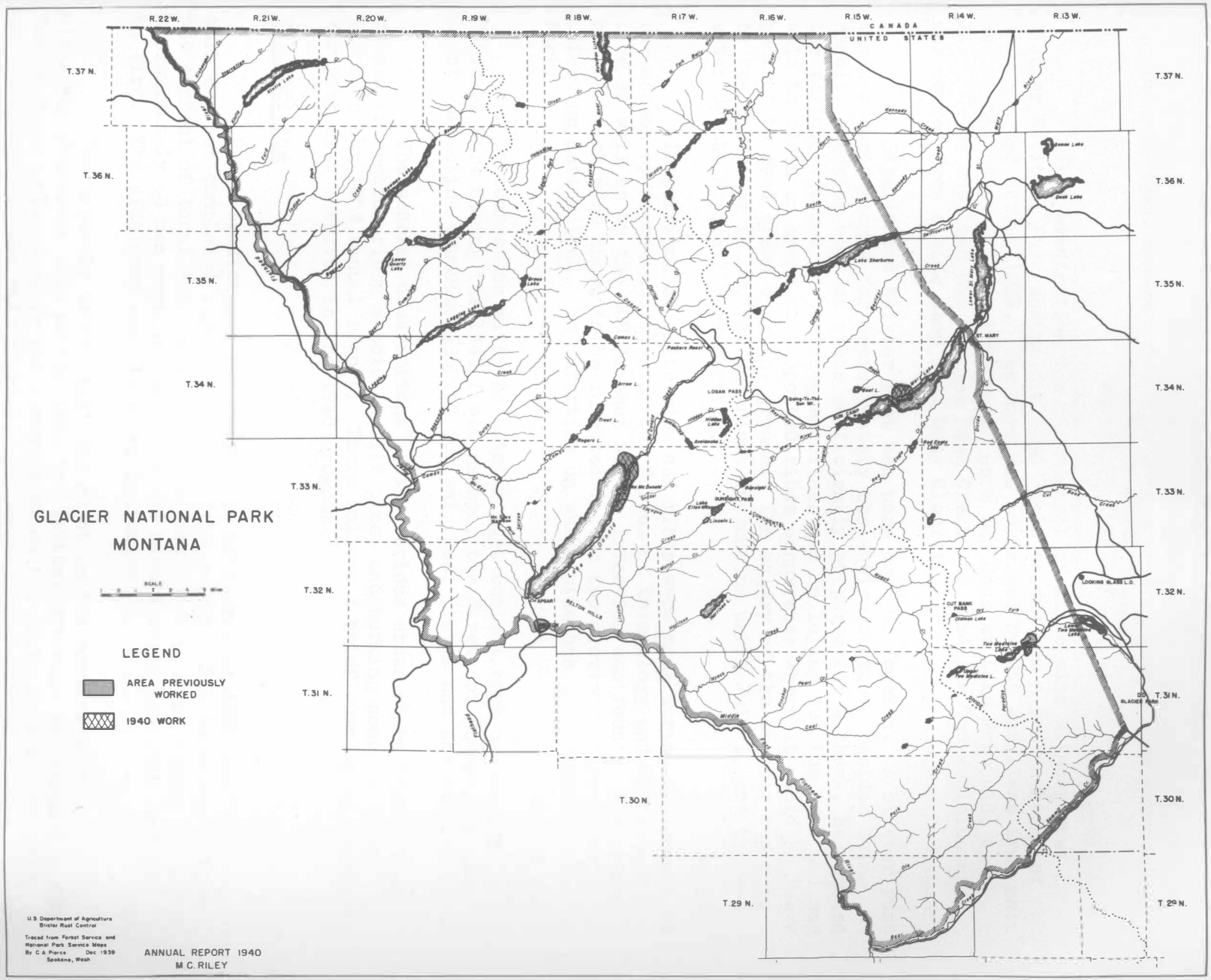
SUMMARY OF RIBES ERADICATION, 1930-1940
MOUNT RAINIER NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste	Total Ribes	Per Acre Basis: Man Days	Per Acre Basis: Ribes
First	Longmire	Open Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543
		All Types	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	436
	Stevens Canyon	Open Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22
		Open Pole	704	38	176		1,052				16		1,244	.05	2
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17
		Stream	1,192	4,741	72,360	2,055	440,386		914	11	3,959		519,685	3.98	436
		All Types	4,247	4,997	100,607	2,055	457,424		914	11	11,890		572,901	1.18	135
	White River	Open Reproduction	66	50	6,869	239	21	1,133	550	194			9,006	.76	136
		Open Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Open Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	2,258	2,401	207,976	82,615	560	140,371	1,744	11,040	91	744	445,141	1.06	197
		Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422
		All Types	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233
	Starbo	Open Reproduction	48	21	68	7		7		2,306			2,387	.44	50
		Open Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		6,730	3,221	18,983			46,396	.74	122
		Stream	46	46	2,663	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120
	All Areas	Open Reproduction	2,739	686	75,289	246	17,108	1,140	5,959	8,303	7,915		115,960	.25	42
		Open Pole	2,906	2,387	185,232	75,660	1,591	145,961	4,410	27,459	107	744	441,164	.82	152
		Open Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	5,967	3,337	287,848	88,753	18,699	147,101	10,374	35,807	8,022	744	597,348	.56	100
		Stream	2,287	6,733	423,566	4,140	543,029	718	64,179	3,446	4,073	8	1,043,159	2.94	456
		All Types	8,254	10,070	711,414	92,893	561,728	147,819	74,553	39,253	12,095	752	1,640,507	1.22	199
Second	Longmire	Open Reproduction	203	97	9,744		1,101						10,845	.48	53
		Stream	614	526	19,977		23,196		2,394	1,426	50		47,043	.86	77
		All Types	817	623	29,721		24,297		2,394	1,426	50		57,888	.76	71
	Stevens Canyon	Stream	745	2,128	49,113	95	140,792				607		190,607	2.86	256
	White River	Open Reproduction	66	12	221			77					298	.18	5
		Open Pole	1,914	1,573	36,284	14,297	2,176	6,849	16,095	33			75,734	.82	40
		Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,302	1,632	37,783	16,308	2,176	6,926	16,095	33			79,321	.71	35
		Stream	394	657	32,748		154		5				32,907	1.67	84
		All Types	2,696	2,289	70,531	16,308	2,330	6,926	16,100	33			112,228	.85	42
	All Areas	Open Reproduction	269	109	9,965		1,101	77					11,143	.41	41
		Open Pole	1,914	1,573	36,284	14,297	2,176	6,849	16,095	33			75,734	.82	40
		Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,505	1,729	47,527	16,308	3,277	6,926	16,095	33			90,166	.69	36
		Stream	1,753	3,311	101,838	95	164,142		2,399	1,426	657		270,557	1.89	154
		All Types	4,258	5,040	149,365	16,403	167,419	6,926	18,494	1,459	657		360,723	1.18	85
Third	Longmire	Stream	393	226	9,451		1,173		316		6		10,946	.58	28
	Stevens Canyon	Stream	220	551	712		23,384						24,096	2.50	110
	White River	Stream	478	279	13,281	2,253	34		703				16,271	.58	34
	All Areas	Stream	1,091	1,056	23,444	2,253	24,591		1,019		6		51,313	.97	47
All Workings	Longmire	Open Reproduction	477	494	50,025		2,202		5,409	5,804			63,440	1.04	133
		Stream	1,633	1,954	215,115		122,143		56,609	4,264	72		398,203	1.20	244
		All Types	2,110	2,448	265,140		124,345		62,018	10,068	72		461,643	1.16	219
	Stevens Canyon	Open Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22
		Open Pole	704	38	176		1,052				16		1,244	.05	2
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17
		Stream	2,157	7,420	122,185	2,150	604,562		914	11	4,566		734,388	3.44	340
		All Types	5,212	7,676	150,432	2,150	621,600		914	11	12,497		787,604	1.47	151
	White River	Open Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Open Pole	3,784	3,660	210,064	83,826	2,715	146,087	17,284	10,834	91	744	471,645	.97	125
		Open Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		All Upland	4,560	4,033	245,759	98,923	2,736	147,297	17,839	11,073	91	744	524,462	.88	115
		Stream	1,295	1,680	208,885	3,753	5,057	242	9,528	188	98	8	227,769	1.30	176
		All Types	5,855	5,713	454,644	102,686	7,793	147,539	27,367	11,261	189	752	752,231	.98	128
	Starbo	Open Reproduction	48	21	68	7		7		2,305			2,387	.44	50
		Open Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122
		Stream	46	46	2,663	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120
	All Areas	Open Reproduction	3,008	795	85,254	246	18,209	1,217	5,959	8,303	7,915		127,103	.26	42
		Open Pole	4,820	3,960	221,516	89,957	3,767	152,810	20,505	27,492	107	744	516,898	.82	107
		Open Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		All Upland	8,472	5,066	335,375	105,061	21,976	154,027	26,469	35,340	8,022	744	687,514	.60	81
		Stream	5,131	11,100	549,848	6,488	731,762	718	87,597	4,872	4,736	8	1,365,029	2.16	266
		All Types	13,603	16,166	884,223	111,549	753,738	154,745	94,066	40,712	12,758	752	2,052,543	1.19	151

TABLE NO. 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1940
MOUNT RAINIER NATIONAL PARK

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
					Man Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	154
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	38	72	9,655	1.89	254
	NP-CCC	4,220	4,968	351,068	1.18	83
	Total	4,258	5,040	360,723	1.18	85
Third	NP-CCC	1,091	1,056	51,313	.97	47
All Workings	NP-Reg.	2,685	3,878	789,826	1.44	294
	NP-CCC	10,918	12,288	1,262,717	1.13	116
	Total	13,603	16,166	2,052,543	1.19	151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R.21 W.
R.20 W.
R.19 W.
R.18 W.
R.17 W.
R.16 W.
R.15 W.
R.14 W.
R.13 W.
CANADA
UNITED STATES
T.37 N.
T.36 N.
T.35 N.
T.34 N.
T.33 N.
T.32 N.
T.31 N.
T.30 N.
T.29 N.
GLACIER NATIONAL PARK
MONTANA
SCALE
LEGEND
AREA PREVIOUSLY WORKED
1940 WORK
LOGAN PASS
GUNSIGHT PASS
CUT BANK PASS
ST. MARY
LOOKING GLASS L.O.
RELTON HILLS
U.S Department of Agriculture
Blister Rust Control
Traced from Forest Service and National Park Service Maps
By C.A. Pierce Dec 1939
Spokane, Wash
ANNUAL REPORT 1940
M.C. RILEY

WHITE PINE BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1940.

By
M. C. Riley
Associate Forester

Ribes eradication for the control of white pine blister rust on Glacier National Park during the 1940 field season was a continuation of the work started during 1939. The work was performed by CCC enrollees from main camps located at Belton, from which work was done at Lake McDonald; at St. Mary, which supplied men for the Roes Creek job, and the Two Medicine area was worked from a side camp from Many Glaciers.

Experienced blister rust men were used as foremen. A blister rust checker was employed for approximately the entire season. Besides doing regular checking work on areas sufficiently prepared for a check, he assisted the various foremen in training enrollees and in laying out the work and was able to clean up areas with spotted ribes occurrence where it would be inexpedient to send crews over the ground. The salary of the checker was paid by the Bureau of Entomology and Plant Quarantine until July 1, and thereafter by the National Park Service.

Inspections of white pine and ribes were made during the course of the season by representatives of the Bureau of Entomology and Plant Quarantine as well as by the CCC foremen but no infection was found. Individual bushes which were known to be infected in the two previous years showed no infection during 1940. No infection on white pine has been found in the Park.

In connection with the blister rust control work on Glacier National Park during the 1940 field season, the Bureau of Entomology and Plant Quarantine expended $808.37 for salaries, travel and supervisory time.

The general descriptions of the various areas where work was performed as regards ribes species, white pine, and working conditions are given in the 1939 annual report. There follows a brief summary of progress for each area involved in the 1940 program.

Two Medicine

Ribes eradication was started on this area in 1939 and the initial work was not completed during the 1940 field season. Due to delays beyond the control of local authorities work was not started until August 12, 1940. Approximately 40 men were in the field but considerable time was lost due to fire. The side camp was closed on September 30.

The majority of the time was spent on the portion of the area along the southwest side of the lake and initial coverage was completed there. Some work was also done in the stream type on the south side of the creek and from there to the main highway.

Some work remains to be done in the pine area south of the camp ground and in the protection area on the south side. The stream type portion of the area worked in 1939 should be given a second working in 1941.

Lake McDonald

A small portion of this area was worked at the end of the 1939 season and initial working was practically completed during 1940. Work was started on May 20, with approximately 20 men and continued, except for much interruption because of fire, until September 20. Initial working would have been completed here had not an exceptionally early frost made ribes identification difficult on one small, dry, exposed portion of the area northwest of the head of the lake.

Crew work was confined entirely to the ground north of the lake and west of McDonald Creek. The remainder was worked by the checker assisted by two picked men. This crew was able to remove the isolated clumps of ribes along the slope east of the lake as well as along the main highway, side streams flowing into Lake McDonald and in and around service roads and areas.

Roes Creek

Ribes eradication was done on this area for the first time in 1940. The work started on July 29 and was terminated on September 20. A maximum of 50 men were used on this area but the average number was about 25.

Practically all of the pine area has been worked north of the highway as well as a good portion of that between the highway and the lake. None of the protection strip has been worked. The worst concentrations of ribes have been removed but there still remains some rather severe working conditions in the canyon along Roes Creek.

RECOMMENDATIONS

In order to complete work already started, crews should be assigned to the Roes Creek and Two Medicine areas again in 1941. The crew which completes the Lake McDonald area should also do the necessary second working on the Belton area along the river and where some of the work done in 1939 on Belton Hills was of poor quality.

A checker should again be employed to do regular checking and to assist the foremen in laying out areas and in blocking out ribes-free ground.

The following tables show the results of the ribes eradication work for the 1940 season and accumulative results for all work done to date:

TABLE NO. 1

SUMMARY OF RIBES ERADICATION, 1940
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man Days	Ribes by Species				Total Ribes	Per Acre Basis	
				Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man Days	Ribes
Two Medicine	Open Pole	100	92	2,779			1,070	3,849	.92	39
	Stream	21	317	16,363			7,054	23,417	15.10	1,151
	All Types	121	409	19,142			8,124	27,266	3.38	225
Lake McDonald	Open Mature	604	634	15,215	2,727	26,139		44,081	1.05	73
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,321	774	18,407	2,806	26,466		47,679	.59	36
	Stream	5	22	4,631	35			4,666	4.40	933
	All Types	1,326	796	23,038	2,841	26,466		52,345	.60	39
Roes Cr.	Open Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
All Areas	Open Pole	186	586	26,856	5,650	6,738	42,243	81,487	3.15	438
	Open Mature	604	634	15,215	2,727	26,139		44,081	1.05	73
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,507	1,360	45,263	8,456	33,204	42,243	129,166	.90	86
	Stream	26	339	20,994	35		7,054	28,083	13.04	1,080
	All Types	1,533	1,699	66,257	8,491	33,204	49,297	157,249	1.11	103

TABLE NO. 2

SUMMARY OF RIBES ERADICATION, 1939-1940
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme	Total Ribes	Per Acre Basis: Man Days	Ribes
Belton	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	284	122	13,428	15,364	8,967		37,759	.43	133
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	All Types	681	445	32,708	43,176	32,986		108,870	.65	160
Two Medicine	Open Pole	346	389	16,774	2,573	1,723	2,853	23,923	1.12	69
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	406	507	20,709	3,623	6,388	4,687	35,407	1.25	87
	Stream	49	464	28,325	434		12,315	41,074	9.47	838
	All Types	455	971	49,034	4,057	6,388	17,002	76,481	2.13	168
Lake McDonald	Open Mature	629	710	17,101	3,601	28,870		49,572	1.13	79
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,346	850	20,293	3,680	29,197		53,170	.63	40
	Stream	5	22	4,631	35			4,666	4.40	933
	All Types	1,351	872	24,924	3,715	29,197		57,836	.65	43
Roes Cr.	Open Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
All Areas	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	716	1,005	54,279	23,587	17,428	44,026	139,320	1.40	195
	Open Mature	629	710	17,101	3,601	28,870		49,572	1.13	79
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	2,519	2,296	97,787	56,129	75,309	45,860	275,085	.91	109
	Stream	54	486	32,956	469		12,315	45,740	9.00	847
	All Types	2,573	2,782	130,743	56,598	75,309	58,175	320,825	1.08	125

SCOUTING FOR WHITE PINE BLISTER RUST IN YELLOWSTONE NATIONAL PARK, 1940

By
Edward L. Joy, Forester

Other than through occasional efforts to find white pine blister rust in and around Yellowstone National Park during the pine-ribes survey work of 1934 and the experimental ribes eradication work just south of the park in 1935 and 1936, no thorough scouting of this area was undertaken until 1937. Even the work within the park of that year can hardly be classed as a thorough job for attention had to be directed first toward about 200 miles of territory between the outposts of known infection in Idaho and the park boundaries. By the time that was completed, frost and early snow had caused such severe ribes defoliation that effective scouting was not possible, so work within the park was not as extensive as desired. However, the 1937 work did result in positive evidence of rust spread from known infection locations in Idaho to points within the 200 miles across Montana to the Wyoming boundary, the farthest being within 19 miles of the park boundary. All of these infections were on the highly susceptible and abundant Ribes petiolare or wild black currant.

In the latter part of August and the first half of September, 1940 many of the better R. petiolare scouting locations across the north half of the park and in the Absaroka National Forest north of the northwest corner of the park were scouted. In addition, a limited amount of work was done in the vicinity of Sylvan Pass on the east and in Teton National Forest and Teton National Park to the south. Although this work resulted in the careful inspection of several thousand ribes bushes and an estimated 1,000 associated Pinus albicaulis and P. flexilis, no evidence of blister rust was found.

Another related area of particular interest, which was covered early in August, is the Bear Creek drainage on the Gallatin National Forest. It was there that the rust location 19 miles from the park was found in 1937. With an excellent association of R. petiolare and P. flexilis in this drainage it appeared most likely that the ribes infection of 1937 would cause pine infection that could be readily detected in 1940. Apparently the transmission of infection in 1937 did not take place for no cankers were observed during a careful inspection of the limber pines both within a short distance of the ribes infection location and throughout the lower half of the drainage.

Considering the rust invasion of this new territory on the basis of long distance spread from pines to ribes, differences in the weather conditions of 1937 and 1940 are undoubtedly responsible in a great measure for the differences in infection conditions. That is, the relatively moist spring and summer conditions in 1937 were favorable for rust spread and accounted for a general movement of the disease to distant locations while, conversely, the extremely dry summer of 1940 precluded this migration. However, it should be expected that the moisture conditions that favored spread from pine to ribes in 1937 likewise favored the short range spread

back to the pines that year. This would have resulted in small, incipient outbreaks of spore producing cankers in 1940 around which localized areas of ribes infection would occur. Since no such areas were found it appears that either there were few, if any, such centers started in 1937, or the cankers formed in 1937 did not mature in the three-year minimum period and therefore did not disseminate spores in 1940. This latter situation is a definite possibility but the most probable situation is a combination of the formation of only a very few small centers in 1937 and the delayed maturing of the cankers until 1941 and later. One thing which is reasonably certain from the scouting of 1937 and 1940 is that there is no extensive pine infection in Yellowstone National Park at present.

The lack of positive evidence of rust invasion by 1940 should not in any sense be interpreted as an indication that the rust threat to this region is any less serious for the eventual occurrence of that combination of factors that are favorable for extensive and serious rust development is a certainty. With the ideal setting for this event in the associations of the most highly susceptible native species of ribes and species of white pine in the West, it will be only a matter of time until this takes place. Because the exact time that such an invasion will take place cannot be accurately predicted, it is essential that a close watch be kept on the progress of the rust in the park region in order that control work can be so conducted as to give adequate and timely protection to the high value areas of white pine. Of greatest value, of course, would be the completion of control work for park areas in advance of general rust establishment, which is a much simpler task than that presented when the disease is present.

PRELIMINARY OBSERVATIONS IN MORRISON CAVE STATE PARK, MONTANA

By
Edward L. Joy, Forester

The Morrison Cave State Park, first established in 1908 as the Lewis and Clark Cavern National Monument, is a recently developed attraction about 45 miles northeast of Butte, Montana. Located about five miles from the Yellowstone Trail Highway it is approximately 14 miles from Whitehall.

With its fissure-like entrance about 1,300 feet above the river and about 500 feet below the rim of Cave Mountain, this phenomena is a series of passages and rooms extending to a depth of about 400 feet from which point a concrete lined tunnel leads out to the mountain slope. Due to the limestone formation of the mountains in this area, the cave is decorated profusely with stalactites and stalagmites, terraces, and carved forms many of which are in color. Extensive developments including stairways, lights and passageways in the cave, and a modern stone administration building nearby have made this an attractive stop for tourists.

Although much of the major ground cover of this region consists of sage and mountain mahogany, Juniperus scopulorum and Pinus flexilis occur scatteringly on most of the ground with the latter growing in fair stands in restricted areas. Within the park are several small areas of limber pine that will probably warrant protection from blister rust at some time in the near future. Chief among these is a small but fine stand of reproduction, averaging about 200 trees per acre, growing on a north facing slope adjacent to the administration building. This structure is located in a saddle some 1,000 feet in elevation above the main highway and about one-quarter mile from the cave entrance.

The ribes in association with the limber pine are Ribes cereum and R. setosum. Their occurrence is generally scattered although the latter grows in patches on rock slides and along the streams. Some of these are of large size which, along with their spiny stems, will make eradication difficult. In general, however, the control work necessary in the park is not great in quantity or difficult.

The nearest known locations of blister rust infection are two found in 1937 on R. petiolare, one about 40 miles southwest in the Wise River District of the Beaverhead National Forest and the other about 75 miles southeast on the Gallatin National Forest adjacent to Yellowstone National Park. Thus it appears likely that the disease is in the introductory stage in the region around Morrison Cave Park. Very limited scouting late in 1940 within this area did not reveal infection but more intensive coverage earlier in the season is necessary for accurate information on this point. However, the discovery of rust within 40 miles in 1937, coupled with the known extremely high susceptibility of limber pine, suggest the advisability of planning for the protection of the important areas of this species in the near future.

PRELIMINARY OBSERVATIONS IN CRATERS OF THE MOON NATIONAL MONUMENT, IDAHO.

By
Edward L. Joy, Forester

Located in a semiarid section of south central Idaho just west of the Snake River desert, Craters of the Moon National Monument is a 49,000 acre reserve of relatively recent volcanic disturbance and lava deposits. Removed by 250 miles from the extensive stands of western white pine, this area is typical of many in this and other parts of the West in that it supports a growth of a secondary species of white pine. In this case the species is Pinus flexilis or limber pine. Of particular importance is the fact that although quite patchy and scattered it is the predominant conifer in this area with Juniperus scopulorum, Pseudotsuga taxifolia and Pinus ponderosa occurring only occasionally.

That the limber pine is of great importance as monotony-breaking cover on the lava and cinder formations is obvious. In this capacity its irregular occurrence at from one to 200 trees of all sizes per acre only adds to the interest of the area. The extremes of treeless cinder mounds with the appearance of huge piles of fine coal, groves of old and gnarled limber pines adjacent on the lower slopes, and the winding rivers of black, barren lava rock in the valleys are unique sights throughout the area.

Of the total of 49,000 acres it is estimated that about 20,000 acres support limber pine. This includes areas that have only a sparse growth of the species but which are intermingled with those supporting fairly complete limber pine cover. Many of the trees are somewhat stunted due to a great extent to heavy attack by mistletoe. In many instances this parasite has killed branches and in some cases entire trees, but stunting is its chief result.

The ribes situation in the area parallels that of the conifers in that one species predominates, and its occurrence is patchy or scattered. This is Ribes cereum, the dry site, small leaved, squaw currant. The bushes are not in any sense thrifty specimens, although some reach about two feet in height and the same in greatest width. Many smaller bushes are growing immediately under the large limber pines but all of these appear to be declining from suppression and drought. Occurrence is from a very few to about 250 per acre with the over-all population relatively light.

Although limber pine is highly susceptible to blister rust, the relatively low susceptibility of R. cereum, the general aridity of both the Monument area and adjacent lands, and the probability that no rust center is very close combine to suggest that control work for the unit is not urgent at this time. Undoubtedly a checkup every three or four years on the spread of rust toward this area with inspection of pines in the Monument will provide adequate information for the timely arrangement of control work.

PINE DISEASE SURVEY AND SCOUTING FOR WHITE PINE BLISTER RUST IN THE INLAND EMPIRE, 1940

By
R. L. MacLeod
Associate Pathologist

INTRODUCTION

As the pine disease survey during the past three years has resulted in sufficient data to determine the effectiveness of past control work and to establish priority of working over most of the white pine belt in the Inland Empire, the work in 1940 was confined for the most part to problem areas or to comparatively small reproduction and cutover areas where information on rust conditions was required. While some work was planned for pole-size trees, very little of this work was accomplished owing to the fact that so much time is consumed for the results received. Any such work would be designed to procure definite data on what is known from general observations and past disease survey work, that pole stands are less susceptible to damage than reproduction stands and are more easily protected. The major problems of control are now centered in reproduction and cutover areas; the pine disease survey was therefore concentrated on such areas.

Plot study work was continued under the leadership of C. R. Stillinger whose report follows this one.

A. Scouting for the Rust.

In the Inland Empire the known infected area remains the same as in 1939. With pine infection over all of the white pine belt, infection may be found on ribes each year in all parts of the area where these bushes occur in any quantity. Consequently, the rust is intensifying to some extent in those parts of the control area where the ribes have not all been removed and at a greatly increased rate in those unprotected drainages where the disease has been present for several years.

The year 1940 was not particularly favorable for the spread of the rust owing to dry weather during the period of aecial production, although the rust intensified to a considerable extent on ribes in the Inland Empire following moist periods in midsummer. Scouting on Glacier National Park failed to locate the rust on ribes or pine. Scouting on the Gallatin National Forest at a point 19 miles from Yellowstone National Park where ribes infection was found in 1937, revealed negative results on both ribes and limber pine. Additional scouting in and adjacent to both Yellowstone and Grand Teton National Parks also failed to reveal the presence of blister rust.

B. Pine Disease Survey

When disease survey work was initiated in October, 1935, too little was known of the extent of the rust. The work in 1936 was an extremely extensive sample of all the white pine type carried on with 33 men with

enlightening results on rust spread and intensification. During 1937 more intensive but still quite extensive work was carried on with 24 men to determine the extent of the disease and yield information on rust behaviorism under various conditions over all of the white pine belt. In 1938 and 1939 more intensive work was carried on with 16 to 20 men to increase the general knowledge of rust conditions in the major portion of the control area; to establish priority of necessary control work on various areas and to determine the effectiveness of the control work performed up to 1936 and 1937. This was a tremendous job resulting in more data than could be handled properly in order to study all the details of rust behavior. The justification for such widespread work was the need for rust information over all of the white pine type for efficient planning of the practical control work; less overall value would have resulted from more detailed work on one-half or two-thirds of the area or the placing of too much emphasis on points of rust behavior which were mainly of academic interest and not immediately applicable to control problems. As a result of this survey, priority of control work could be determined readily on all operations and available appropriations expended where the need was greatest; definite information had been secured on some of the fundamental aspects of rust behavior under various conditions and valuable data had been provided on the effectiveness of past control work. Concerning the latter point, the 1938 survey cast some doubt on the adequacy of control standards and the 1939 work resulted in making ribes eradication standards more strict. In 1939 results were secured on the wave of infection in 1937, a decidedly favorable year which resulted in a wide spread to new areas and severe intensification in areas where the rust was already present even where small numbers of ribes per acre were left.

As a result it was realized that standards of ribes eradication efficiency were not adequate up to 1938. Widespread studies on control work accomplished in 1939 and 1940 cannot be carried on until 1945 and 1944 at the earliest. In the meantime, disease surveys can be carried on in problem reproduction areas and in securing data on the rate of intensification in and disease tolerance of pole stands. This work will require less men; in 1940 the work was performed with four WPA employees and six men employed on regular Forest Service funds.

RESULTS

The amount of work accomplished in the Inland Empire is shown by operations in Table No. 1.

TABLE NO. 1

PINE DISEASE SURVEY, 1940
SUMMARY BY OPERATIONS

Operation	Miles of Strip	White Pine			Cankers	
		Number Examined	Infected			
			Number	Per Cent	Number	Per 100 Trees
Clearwater	126.2	62,757	10,288	16.4	31,971	51.0
Coeur d'Alene	19.7	1,523	215	14.1	837	55.1
St. Joe	83.6	26,435	3,981	15.1	13,104	49.6
Kaniksu	64.5	23,916	864	3.6	2,849	11.9
Mt. Spokane	19.6	11,406	78	.7	128	1.1
Total	313.6	126,037	15,426	12.2	48,889	38.8

More detailed data for each operation compiled by drainage and segregated by years when ribes eradication work was performed are shown in Tables Nos. 2 and 3.

TABLE NO. 2

PINE DISEASE SURVEY, 1940
SUMMARY BY DRAINAGE AND YEARS OF RIBES ERADICATION, CLEARWATER OPERATION

Drainage		White Pine			Cankers		Cumulative Per Cent by Years of Trees Infected					Number of Ribes Per Acre		
Years of Ribes Eradication	Miles of Strip	Number Examined	Infected Number	Infected Per Cent	Number	Per 100 Trees	Up to 1931	1932-1934	1935-1936	1937	1938	viscosissimum	lacustre	Total
Hall Creek Burn, T.40N R.7E Sec.18,19														
1933	1.1	2,210	464	21.0	853	38.6			.2	6.3	21.0	17.3	1.3	18.6
1933,1939	1.3	5,688	1,569	27.6	3,135	55.1		.2	.5	14.3	27.6	17.6		17.6
Unworked	.2													
Total	2.6	7,898	2,033	25.7	3,988	50.5		.1	.4	12.1	25.7	15.8	.6	16.4
Shoe Burn, T.40N R.6E Sec.26,27														
1933	.5	2,580	1,821	70.6	5,578	216.2	1.4	10.1	13.2	54.4	70.5*	314.7		314.7
Harlan Creek Ridge, T.40N R.6E Sec.27,28,34														
1933	.8	151	104	68.9	897	594.0		.7	6.6	66.9	68.9	15.2	.6	15.8
1934	.9	133	62	46.6	191	143.6		2.3	3.8	37.6	46.6	12.2	.6	12.8
Total	1.7	284	166	58.5	1,088	383.1		1.4	5.3	53.2	58.5	13.6	.6	14.2
Moose City, T.39N R.11E Sec.4,5,9														
Unworked	9.8	8,401	647	7.7	3,914	46.6		.4		4.3	7.7	1.1	63.4	64.5
Upper Beaver Plantation, T.39N R.5E Sec.11,14														
1934,1938	1.5	445	59	13.6	113	25.4		.7		8.7	13.6	7.6	7.3	15.0
1934,1938,1939	3.6	792	42	5.3	83	10.5			.1	2.5	5.3	1.7	1.7	3.4
1935,1938	.2	59	9	1.5	14	2.4				.5	1.5		2.0	2.0
Total	5.3	1,296	110	8.5	210	16.2		.2	.3	4.8	8.5	3.3	3.3	6.6
Bungalow Area, T.38N R.7E Sec.13,19,24														
Unworked	1.7	742	274	36.9	2,367	319.0		3.8	5.5	29.5	36.9	47.3		47.3
North Fork Reeds Creek, T.38N R5E Sec.11,14,15,22														
1932	3.0	3,414	498	14.6	921	27.0		.05	.1	7.9	14.6	36.7	13.5	50.2
1933	5.1	3,043	559	18.4	1,197	49.3				7.8	18.4	32.9	17.6	50.6
1933,1936	15.5	9,681	772	8.0	1,648	17.0		.02	.2	3.9	8.0	17.7	5.7	23.4
1933,1937	1.3	136	1	.7	1	.7				.7		33.1		33.1
Total	24.9	16,274	1,830	11.2	3,767	23.1		.02	.1	5.4	11.2	23.9	8.8	32.7
Lower Reeds Creek, T.39N R.4E Sec.14,15,22,23														
1936	5.8	2,369	844	35.6	4,305	181.7	.1	5.6	11.8	30.9	35.6	39.2	2.1	41.9
1937	1.2	486	202	41.6	944	194.2		3.9	9.9	36.0	41.6	102.8		102.8
Total	7.1	2,855	1,046	36.3	5,249	181.9	.1	5.2	11.4	31.4	36.3	50.2	1.8	52.6
Poorman Creek, T.37N R.4-5E Sec.13,18														
1934	3.0	2,566	324	12.6	1,048	40.8	.04	1.4	1.6	9.5	12.6	16.5	2.5	19.0
1934,1939	.7	286	55	19.2	69	24.1				17.5	19.2	.8		.8
Total	3.7	2,852	379	13.3	1,117	39.2	.04	1.3	1.5	10.3	13.3	13.7	2.0	15.7
Musselshell Creek, T.35N R.6E Sec.20,21,22,23,26,27,28,29,33,34														
1932	1.8	1,631	117	7.2	205	12.6	.6	.6		3.3	7.2	26.6	2.5	29.1
1934	9.1	2,649	567	21.4	1,658	62.6	.2	5.2	5.4	13.9	21.4	19.1	1.3	20.3
1935	10.1	2,317	218	9.4	455	19.6	.04	1.8	1.9	5.7	9.4	16.3	3.4	19.7
1936	.9	145	5	3.4	6	4.1			.7		3.4	13.4		13.4
1937	1.1	293	10	3.4	12	4.1				1.7	3.4	40.9	41.8	82.7
Total	23.0	7,035	917	13.0	2,336	33.2	.1	2.7	2.8	7.9	13.0	19.3	4.2	23.5
Pierce Area, T.36N R.5E Sec.2,11														
1933,1937	3.6	930	151	16.2	382	41.1		.4	1.3	14.5	16.2	10.8	.1	10.9
Grasshopper Creek, T.36N R.5E Sec.17,20,21														
1935	9.3	3,155	303	9.6	592	18.8		.4	.6	6.5	9.6	2.4	.2	2.6
1935,1938	2.2	556	92	16.5	182	32.7		.5	.9	14.9	16.5	1.1	.2	1.3
Total	11.5	3,711	395	10.6	774	20.9		.4	.6	7.8	10.6	2.1	.2	2.3
Lolo Creek, T.35-36N R.6E Sec.2,3,4,10,11,14,15,16,17,20,35														
1932	4.0	1,657	166	10.0	363	21.9		.7	1.2	7.8	10.0	58.5	1.1	59.6
1932,1935	.2	33										2.0		2.0
1932,1937	1.6	1,814	27	1.5	30	1.6		.2		1.2	1.5	.9		.9
1933	4.2	625	75	12.0	228	36.5	.2	1.8	2.1	8.8	12.0	4.5	.8	5.3
1933,1937	1.3	109										4.9		4.9
1934	4.8	951	25	2.6	112	11.8		.3		2.2	2.6	2.9	.8	3.7
Total	16.1	5,189	293	5.6	733	14.1	.02	.6	.8	4.4	5.6	17.1	.7	17.8
Eldorado Creek, T.34N R.6E Sec.23,24,25,26,27,28,33,34,35														
1932	9.7	1,206	146	12.1	315	26.1		.2	.3	8.0	12.1	68.7	10.1	78.8
1935	3.4	1,219	37	3.0	70	5.7		.2		2.4	3.0	8.1	1.0	9.1
1936	1.7	285	43	15.1	83	29.1		.3		5.6	15.1	351.2	33.9	385.1
Total	14.7	2,710	226	8.3	468	17.3		.2	.3	5.2	8.3	87.2	10.7	97.9
Grand Total	126.2	62,757	10,288	16.4	31,971	50.9	.1	1.2	1.8	10.5	16.4	26.9	9.1	36.0

*Percentage for 1938 does not check with percentage for drainage due to the fact that the negligible amount of infection of 1939 origin is not included in the table.

TABLE NO. 3

PINE DISEASE SURVEY, 1940
SUMMARY BY DRAINAGE AND YEARS OF RIBES ERADICATION
ST. JOE, COEUR D'ALENE, KANIKSU AND MOUNT SPOKANE OPERATIONS

Drainage		White Pine			Cankers		Cumulative Per Cent by Years of Trees Infected					Number of Ribes Per Acre		
Years of Ribes Eradication	Miles of Strip	Number Examined	Infected Number	Infected Per Cent	Number	Per 100 Trees	Up to 1931	1932-1934	1935-1936	1937	1938	viscosissimum	lacustre	Total
St. Joe Operation														
Mica Creek, T.44N R.2E Sec.5,8,9,16,17														
1936	4.7	2,555	716	28.0	2,781	108.8	.2	3.1	4.9	22.2	28.0	.5	1.7	2.2
1936,1939	.6	307	139	45.3	308	100.3		11.7	19.5	40.4	45.3		1.8	1.8
1939	3.6	2,141	864	40.4	3,872	180.9	2.1	4.7	5.6	23.4	40.4	3.9	1.7	5.5
Total	8.9	5,003	1,719	34.4	6,961	139.1	1.0	4.3	6.1	23.8	34.4	1.9	1.7	3.6
St. Maries River, T.43N R.2E Sec.31,35,36, T.42N R.2E Sec.7														
1934	4.3	2,876	189	6.6	351	12.2	.07	2.2	2.5	6.4	6.6		.2	.2
1934,1938	.8	149	28	18.8	46	30.9	2.7	13.4		18.1	18.8			
Total	5.1	3,025	217	7.2	397	13.1	.2	2.7	3.1	7.1	7.2		.2	.2
Elk Creek, T.41N R.2E Sec.13,14,15,22,23,24,25,26,27, T.41N R.3E Sec.18,19,30														
1934	3.8	643	110	17.1	320	49.8		.3		6.7	17.1	3.8	40.0	43.8
1935	11.7	2,294	292	12.7	502	21.9		.2		2.2	12.7	146.0	39.0	185.0
1936	2.5	750	162	21.6	334	44.5		.1		10.7	21.6	65.0	18.0	84.0
1934,1938	.5	101										33.0	2.0	35.0
1936,1938	2.0	586	32	5.5	37	6.3				2.7	5.5	2.0	5.5	7.5
Unworked	7.5	901	330	36.6	1,951	216.5		1.8		21.5	36.6	57.0	34.0	92.0
Total	28.0	5,275	926	17.6	3,144	59.6		.4		7.3	17.6	83.0	33.0	116.0
Moose Creek, T.41N R.1W Sec.23,25,26,27,35,36														
1934	8.6	835	10	1.2	12	1.4		.1		.2	1.2	.1		.1
East Emerald Creek, T.42N R.1E-1W Sec.7,12,13,18														
1935	1.7	263	8	3.0	13	4.9		.8	3.0			18.3	1.7	20.0
1936	4.6	1,711	212	12.4	677	39.6	.6	4.8	5.6	11.6	12.4	14.6	2.9	17.5
1937	4.1	1,875	174	9.3	315	16.8	.3	3.1	3.7	9.0	9.3	2.1	2.0	4.1
1936,1937	.8	14										.6		.6
1936,1939	1.2	882	76	8.6	228	25.9	1.2	5.0		8.5	8.5	2.5	.4	2.9
Unworked	.1	4	2	50.0	3	75.0			50.0			76.0		76.0
Total	12.5	4,749	472	9.9	1,236	26.0	.5	3.9	4.6	9.5	9.9	9.6	2.0	11.6
Cedar Creek, T.39N R.2E Sec.35														
1936	2.0	812	325	40.0	799	98.4	3.2	15.0	22.2	32.0	40.0	10.5	.3	10.8
Long Meadow Creek, T.39N R.2E Sec.1,2,3,10,11,12														
1935	12.7	4,310	108	2.5	149	3.5				1.2	2.5	2.8	2.3	5.2
1936	5.8	2,426	204	8.4	406	16.7		.5	.5	3.9	8.4	4.6	9.4	14.0
Total	18.5	6,736	312	4.6	555	8.2		.2	.2	2.2	4.6	3.4	4.5	7.9
Grand Total	83.6	26,435	3,981	15.1	13,104	49.6	.4	2.4	3.1	10.0	15.1	30.0	12.0	43.0
Coeur d'Alene Operation														
Fortier Creek, T.49N R.2W Sec.26,27,28,29,33,34,35,36														
Unworked	19.7	1,523	215	14.1	837	55.1	.1	1.8	2.8	11.9	14.1	18.1	6.1	24.2
Kaniksu Operation														
Packer and Zero Creeks, T.62N R.5W Sec.8,17,18,19,21,28														
1936	14.6	3,073	40	1.3	50	1.6				.5	1.3	.5	.5	1.0
1938	.2	8												
Total	14.8	3,081	40	1.3	50	1.6				.5	1.3	.5	.5	1.0
Beaver Creek, T.52N R.4-5W Sec.1,6,7,8,12,13,17,18														
1934	3.4	1,094	9	.8	9	.8				.8		1.8	2.5	4.3
1936	6.1	5,839	62	1.1	68	1.2				1.0	1.1	6.2	1.9	8.1
Unworked	3.5	1,766	20	1.1	25	1.4				1.0	1.1	141.0	3.1	144.1
Total	13.0	8,699	91	1.0	102	1.2				.9	1.0	41.0	2.4	43.0
Pack River, T.59N R.2W Sec.4,5,6,7,8,9, T.60N R.2W Sec.7,8,9,10,16,17,18,19,29,30,31,32,33														
1935	12.4	4,138	93	2.2	175	4.2		.1	.2	1.2	2.2	.6	2.6	3.2
Unworked	21.4	7,582	597	7.9	2,345	30.9		.03	.3	3.5	7.9	13.0	20.0	34.0
Total	33.8	11,720	690	5.9	2,520	21.5		.05	.2	2.8	5.9	8.8	14.0	23.0
Sullivan Creek, T.39N R.45E Sec.9,10,19,20														
1936	1.1	146	4	2.7	5	3.4				.7	2.7			
1939	1.9	270	39	14.4	172	63.7		.4		4.1	14.4	.3	.5	.8
Total	3.0	416	43	10.3	177	42.5		.2		2.9	10.3	.2	.3	.5
Grand Total	64.5	23,916	864	3.6	2,849	11.9		.03	.1	1.8	3.6	13.0	8.1	21.0
Mount Spokane Operation														
Spirit, Deadman and Thompson Creeks, T.28N R.45E Sec.22,23,24,25,26,27,34,35														
1935	1.0	429										4.0	44.0	48.0
1935,1936	2.7	1,715	13	1.1	13	1.1		.1		.4	1.1	5.3	4.1	9.4
1935,1937	2.8	2,999	12	.4	16	.5		.1		.4		11.1	21.1	32.2
1935,1936,1938	.5	13											11.0	11.0
1935,1936,1939	.7	825										8.0		8.0
1935,1937,1939	3.1	683	15	2.2	55	8.1		.6		2.0	2.2	4.1	3.4	7.5
1936	2.1	372										2.0	9.2	11.2
1936,1938	1.5	1,177	8	.7	8	.7				.5	.7	35.3	2.0	37.3
1936,1939	1.1	1,189	7	.6	7	.6				.6		3.4	4.2	7.6
1938	2.5	487	7	1.4	10	2.1				.2	1.4	5.2	5.2	10.4
Unworked	1.7	1,517	16	1.1	19	1.3				.7	1.1	6.0	6.0	12.0
Grand Total	19.6	11,406	78	.7	128	1.1		.1		.5	.7	8.0	9.1	17.1

DISCUSSION

The most striking result of the 1940 survey is the fact that the rust increased during 1937 or 1938 in all reproduction areas surveyed on all operations regardless of when control work was performed. From this arresting result the most important conclusion to be drawn is that a new conception of rust potentiality must be recognized by all control personnel if successful protection is to crown their efforts in the younger stands of pine. As a result of this new rust potentiality, more serious consideration must be given to the number of ribes which may be left for a period of years in any area and to the practicability of securing protection in certain reproduction or cutover areas.

The rust became established in the white pine belt of the Inland Empire in 1923, a favorable year. These cankers were producing aecia by 1927, the next favorable year, when a second wave greatly extended the number of spot infections. While there was some new infection originating during the intervening years, the next wave year occurred in 1932 in parts of the white pine belt, in others in 1933. While there was a considerable extension of pine infection in 1935 and 1936 owing to the fact that the 1932 and 1933 infection had started to produce aeciospores, the next wave of infection occurred in the favorable year 1937. This wave resulted in such heavy intensification in infected areas and such wide spread to new areas that the situation is now dangerous on all operations. While in the past the wave years have been dangerous and the intervening years much less so, after 1940 each year will represent a much greater potentiality of danger than prior to that time. This has been indicated in the fact that a considerable amount of infection occurred in 1935 and 1936, less favorable years, when infection of 1932 and 1933 origin started to produce aecia. It is indicated by the amount of infection of 1938 origin shown in Table No. 2. Here, in general, the areas which do not show much infection of 1938 origin were surveyed prior to July when infection of 1938 origin started to appear in quantity. In some cases more infection originated in 1938 than in 1937. Although weather conditions were less favorable in 1938, the infection of 1935 origin had started to produce aecia which, coupled with the production of aecia from the 1933 wave, resulted in a dangerous condition. Some of the cankers of 1937 origin started to produce aecia in 1940, more will fruit in 1941; some cankers of 1938 origin will also fruit in 1941. This will result in a new rust potentiality whether 1941 is a favorable year or not. While it is necessary to protect against the worst possibility, the wave years, a new conception of danger in the intervening years from any number of ribes must result from considering the effects of the heavy intensification in 1937 and 1938.

During the period from 1933 when spot infections became widespread to 1939 when the results of the 1937 wave were evident, many areas with 25 or 50 or even 100 ribes per acre showed no introduction of the rust. This resulted in a false sense of security, a belief that the arbitrary standards of efficiency were sufficiently strict. The results of the 1939 survey showed that this was not true, consequently the standards were made more strict. The 1940 surveys confirmed the indication that small numbers of

ribes were not safe when the rust was present in any reproduction area. While the rust increased tremendously where 15 or 20 or more ribes were present in an area of light rust, a dangerous increase occurred where ribes averaged more than five per acre; in areas of heavy rust, with 20 to 30 per cent of the pine infected, an increase occurred with less than five ribes per acre. This is particularly true on the St. Joe and Clearwater operations, but it is disconcerting to note that the rust is now evident on parts of the Coeur d'Alene and Kaniksu where no rust was found previously and where the smaller numbers of ribes had been considered comparatively safe for a period of years.

It is now evident that in areas of reproduction showing more than 10 or 15 per cent infection the ribes must be reduced to practically zero. It is also quite evident that this will be extremely expensive on some areas with difficult working conditions. More costly work and more workings on such areas must be recognized as necessary to carry the 0-10 year age class to pole size or maturity. It is becoming increasingly evident that with present appropriations ultimate success on all reproduction areas now included in the control area is doubtful. From these facts it may be seen that the question of values becomes paramount. It is, therefore, recommended that control work be confined to the higher value areas and that the younger reproduction stands with poor stocking, some areas with more than 15-20 per cent of the pine infected or with heavy working conditions which preclude the possibility of reducing the ribes to one or two per acre, be eliminated from further consideration as control area.

BLISTER RUST PLOT STUDIES

By
C. R. Stillinger
Assistant Pathologist

The intensive study of white pine blister rust as a supplement to the general survey for the disease by means of specific plots was continued during the 1940 field season. Due to the volume of work necessary on the plots which had been previously established, no new plots were started. The entire summer season was employed in improvement work and making inspections of ribes, recording the amount of disease present and inspecting pine on those plots where data could be obtained which would have a direct bearing on some of the eradication problems. The pertinent results obtained from a particular plot are given in this report. All plots discussed in detail are in the Clearwater operation.

POWDER HOUSE PLOT

This plot of 95 acres is located in the SE. ¼ sec. 27, T. 37 N., R. 5 E. about four miles north of Pierce, Idaho. The timber was clear cut in 1928. At present the area is well stocked with white pine about ten years old, varying from quite open to dense growth and averaging about 1,200 trees per acre. The ribes were eradicated in 1933, averaging about 250 bushes per acre.

Since the disease was established upon the pine on this plot during or before 1933, and since it was evident that a considerable amount of infection had developed from the 1937 wave of infection and further, since the ribes had been reduced to approximately 1.74 bushes per acre by the eradication work in 1933, the trees on this area appeared to present an opportunity to obtain definite information regarding the infecting power of individual bushes as well as clumps of Ribes lacustre, R. viscosissimum and R. petiolare under a variety of ecological conditions. Therefore, the decision was made to inspect around each bush or clump in order to determine the amount of infection which was present. As this inspection progressed it became apparent that, although there was some concentration of infection around the bushes, there was scattered infection over the entire plot. For this reason all the pine on the approximate 95 acres were inspected. Also, in order to study the relation of the infection, not only to the ribes but to the topography, a contour map with ten-foot intervals was prepared. These data are being compiled preparatory to their analysis but because of the volume of the data the work has progressed only far enough to give a partial report at this time.

All ribes on the plot were inspected for blister rust and the amount of disease present was recorded. During this inspection some new ribes were found. Also, the ribes population was reduced from 165 to 69 or approximately 42 per cent of the original (Table 1). All concentrations were eliminated and the ribes which were left were spaced so that a ribes-free zone of approximately three chains on all sides was left around each bush. On a per acre basis the ribes were reduced from 1.74 bushes with

31 feet of live stem to 0.73 bushes with 15 feet of live stem. Table 1 gives a summary of ribes population and the amount of disease found on the ribes in 1940 compared with that in 1939. In order that the data might be more comparable, the bushes which were found for the first time in 1940 have been tabulated separately.

TABLE 1

SUMMARY OF RIBES DATA - POWDER HOUSE PLOT, 1939-1940

Year Insp.	No. Bu.	F.L.S.	No. Lvs.	Lvs. Per FLS	Total Disease Sq.In.	Total Inf. Lvs.	Per Cent Lvs. Inf.	Ave.Inf. in Sq. In. Per Inf.Leaf	Ave.Inf. in Sq. In. Per F.L.S.	Not Erad. 1940 No. Bu.	Not Erad. 1940 F.L.S.
Ribes lacustre											
1939	35	869.9	21,561	24.8	18.88	372	1.73	.0508	.0217		
1940	34*	1,041.3	13,880	13.3	38.98	718	5.17	.0543	.0374	15	233.4
New	3	6.8	102	15.0	.04	1					
Ribes viscosissimum											
1939	80	1,335.8	15,520	11.6	433.30	2,670	17.20	.1623	.3244		
1940	78**	1,521.8	12,370	8.1	389.49	2,221	17.95	.1753	.2559	51	1,214.5
New	15	221.2	2,318	10.5	42.02	530					
Ribes petiolare											
1939	31	172.7	982	5.7	227.15	711	72.40	.3195	1.315		
1940	30*	148.0	915	6.2	229.64	796	86.99	.2885	1.552	3	9.1
New	1	4.5	22	4.9	25.45	22					

*One bush dead in 1940.
**Two bushes eradicated in 1939.

In general, about the same amount of square inches of disease for the same bushes was present on the R. viscosissimum and R. petiolare in 1940 as was found in 1939, but twice as much was found on R. lacustre in 1940. This same difference is evident when the per cent of leaves infected is compared. The difference in susceptibility between the different species is suggested by a comparison of the average infection per infected leaf and the average infection per foot of live stem for the three species.

The difficulty to find all the ribes on an area is illustrated by the new ribes found in 1940. During 1939 the area was inspected carefully by selected eradication men in order to find every bush, if possible. However, in 1940, 19 additional bushes were found, or an increase of 13 per cent. These new bushes were nearly all large enough to be seen readily, were all in separate locations and out in the open so that the eradication men should have found them.

The progress of the disease since eradication presents a serious situation. It was probably first established in one spot in 1929, but since the eradication was done late in 1933, a favorable year for infection, 0.4 per cent of the pine were infected that year. This infection was distributed

W 2682. General view of Hollywood Plot looking southwest.

generally over the area. The serious situation is that, although the ribes were reduced from approximately 250 per acre to 1.74 per acre, yet as a result of one wave the per cent of infection jumped to an average of 5.7, a rate of increase indicating that in 12 to 15 years this stand may be seriously damaged by this small number of ribes. Indeed, in some cases around individual bushes or groups of bushes the percentage of infection is much higher. In other cases where the ribes bushes were exposed to the winds and were not screened on all sides by trees, the result was a wide scattered distribution of the disease for several chains. Detailed data on these points cannot be presented because the information has not been analyzed.

The probable wide distribution and the lack of concentration of the disease near the bush in the case of ribes in open spaces, especially those on hilltops, reveals this type of situation as more important than has been expected. However this uniform wide distribution may not always represent serious damaging power if every ribes is removed from the surrounding stands. But since it is proving very difficult to eradicate the last few ribes in a stand, and the presence of a fruiting canker within a few feet of a bush makes any ribes a serious menace, it may be advisable to eradicate the ribes from some open ridges in our white pine stands for a considerable distance from the pine.

HOLLYWOOD PLOT 9

This plot of 6.4 acres is located in sec. 17, T. 37 N., R. 5 E. The timber was cut selectively in 1934, leaving a considerable number of pine for seed trees and a possible second cutting. (See Photo W 2682) The area is well stocked with young white pine about six years old. Because no eradication of the ribes had been carried out, the situation represents the natural conditions following logging in a region where blister rust was established in the older timber previous to logging. Thus, the area offered an opportunity to study the effect of white pine blister rust upon a young developing stand from which the ribes had not been eradicated. A plot 8 chains square or 6.4 acres was established. In 1939 the entire plot was searched for ribes. Those found on the two outside chains were eradicated, providing a protection zone of two chains around the center four chain square. During the season of 1940 the pine on the entire 6.4 acres were inspected for blister rust infection. Also a search was made for any ribes which were missed in 1939. Since the pine were small all of those infected as well as all ribes on the plot were numbered and staked. The tops of the pine stakes were painted red and those for the ribes, white. A blue band was painted around each stake representing an infected pine if the pine were already dead from blister rust, and around each stake representing a ribes if the bush had been eradicated. This procedure provided a method for keeping a record of the developments which take place on the plot, presented a visual picture of what infection had already developed on the pine and demonstrated in a striking manner the relationship between the occurrence of ribes and infection on the pine. This setup proved especially valuable for demonstrating the effects of blister rust to those who were not familiar with the problem.

Except for one small upland R. petiolare all the ribes on the plot were found to be R. viscosissimum. This population has all developed since the timber was cut. For the entire plot an average of 47 ribes per acre was found. The 1.6 acres in the central part of the plot averaged 70 R. viscosissimum per acre. This year, after a study of the distribution of the ribes, the population for the entire plot was reduced to 11 ribes per acre. The ribes which were left are located in such relative positions that the influence of each bush will be indicated by any future infection which may develop.

The inspection of the white pine for blister rust revealed an interesting situation. The reproduction averaged 4,335 trees per acre varying from 600 to 10,000 trees. Only 2.93 per cent of the trees were found to be infected, the rate of increase indicating that without removal of any of the ribes the trees will all be infected in ten to fifteen years. Probably all of those already infected will be killed. With the exception of the chain square in the northwestern corner all of the infection occurred in 1937 or later. About one-half of this chain had a dense growth of white pine twenty-five to fifty years old, and in this group 39 per cent of the trees were infected. Nine per cent of these trees were infected during the period 1932 to 1933.

TRAIL CREEK PLOT 6

This plot of 6.4 acres is located in the NE. $\frac{1}{4}$ sec. 10, T. 37 N., R. 5 E. about seven miles north of Pierce, Idaho. The timber on the general area was clear cut in 1928. The site is now well stocked with almost a pure stand of white pine eight to ten years old, averaging 1,783 white pine per acre. In 1933 approximately 325 ribes per acre, in the proportion of about one R. lacustre to two R. viscosissimum, were removed.

In 1938 a plot of 1.6 acres, four chains square, was laid out. In 1939 a two chain wide protection zone was established around this plot and all ribes which were found were eradicated. An inspection of the main plot revealed that the ribes present were entirely R. lacustre. During the 1940 season the locations of all of these ribes were marked with white stakes and each was given a number. Picture W 12 gives a good idea of the ribes and white pine distribution on the plot.

Since the ribes population consisted entirely of R. lacustre, many of which were small yet old bushes, due to grazing, and this condition had existed since 1933, this plot presented an opportunity to secure definite information on the amount of rust which the various sized bushes might carry as well as data on the pine infection which had developed from such a population of R. lacustre. Therefore, all the ribes on the plot were carefully inspected, all the pine on a strip one chain wide and four chains long were inspected and all trees and cankers which were found on this strip were numbered.

W 12 General view of the west of Trail Creek Plot 6. White stakes are locations of individual Ribes lacustre bushes.

TABLE 2

SUMMARY OF SIZE, FEET OF LIVE STEM AND INFECTION ON RIBES LACUSTRE
TRAIL CREEK PLOT 6

	Height Classes by Inches												
	0-6	7-12	13-18	19-24	25-36	37-48	49-60	61-72	73-84	85-96	97-108	109-Over	Totals
No. Bushes	241	165	78	18	5								507
Percent Bushes	47.5	32.5	15.4	3.6	1.0								100
No. Inf.	58	63	34	7	4								166
% of Tot. Inf.	34.9	38.0	20.5	4.2	2.4								100
% of Class	24.1	38.2	43.5	38.9	80.0								
% Tot. Bu.	11.4	12.4	6.7	1.4	.8								
	Class by Inches Live Stem												
No. Bushes	178	107	61	34	48	28	13	10	9	5	2	12	507
Percent Bushes	35.1	21.1	12.0	6.7	9.5	5.5	2.6	2.0	1.8	1.0	.4	2.3	100
Total In. L.S.	657	970	940	736	1,476	1,051	702	664	695	453	196	1,966	10,506
Percent Total	6.3	9.2	9.0	7.0	14.0	10.0	6.7	6.3	6.6	4.3	1.9	18.7	
Tot. Lvs.	1,407	1,767	1,570	1,093	2,459	1,674	871	1,042	1,076	822	447	3,249	17,477
Percent Total	8.1	10.1	9.0	6.3	14.1	9.6	5.0	6.0	6.2	4.6	2.5	18.5	100
Lvs. per Ft.L.S.	25.7	21.9	20.0	17.8	20.0	19.1	14.9	18.8	18.5	21.7	27.4	19.8	20.0
Tot. Lvs. Inf.	117	72	183	127	197	103	85	55	55	7	42	15	1,058
% of Inf. Lvs.	11.1	6.8	17.3	12.0	18.6	9.7	8.0	5.2	5.2	.7	4.0	1.4	
% Lvs. in Class	8.3	4.1	11.7	11.6	8.0	6.1	9.8	5.3	5.1	.8	9.6	.5	6.1
Tot. Sq. In.Inf.	11.32	6.86	9.18	8.18	11.90	6.52	11.16	1.64	1.38	.43	2.30	.43	71.30
% Tot. Inf.	15.9	9.6	12.9	11.5	16.7	9.1	15.7	2.3	1.9	.6	3.2	.6	100

Table 2 is a summary of the data resulting from the inspection of all the R. lacustre on the plot. This table gives a classification of all the bushes by height classes as well as a classification of the bushes by feet of live stem and disease data for each classification. In examining the data two facts should be borne in mind; that the data are for 1.6 acres, and that the small bushes are dwarfed and stunted due to suppression and grazing instead of age. The data with reference to these small bushes on the plot are especially interesting. For example, by height classes, 47.5 per cent of the bushes are six inches or less in height, and 35 per cent of the infected bushes are in this class. By live stem classes, 35 per cent of the bushes have six inches or less of live stem, have only 6.3 per cent of the total live stem of all ribes and 8.1 per cent of the leaves, yet have 15.9 per cent of the total disease on all the ribes. If the first two classifications by feet of live stem are grouped, then the data show that 56.2 per cent of the bushes have one foot or less of live stem but have only 15.5 per cent of the total feet of live stem, only 18.2 per cent of the total leaves, yet have 25.5 per cent of the total infection. The data indicate that the small bushes must be found and eradicated if protection of the white pine from blister rust is to be obtained.

This point, as well as the general infecting power of R. lacustre alone, is emphasized by the data for the infection on white pine which has developed since the eradication work in 1933. On a per acre basis the plot has an average of 1,783 white pine and 317 ribes with 547 feet of live stem. At the time of eradication, three per cent of the pine were infected. In 1940, 44 per cent of the pine were found to be infected. Nearly all of the increase was due to the 1937 wave of infection.

These data reveal the following points: that serious blister rust damage to white pine may be caused by the presence of R. lacustre; that small, stunted bushes of R. lacustre may develop a high percentage of blister rust when compared with larger bushes; and that ribes re-eradication must be timed according to the stage of the development of the rust on a particular area. With reference to the last point, the ribes on this area should have been eradicated again during or before 1937 and again, if necessary, by 1941 at the latest instead of in 1940 if infection were to be greatly retarded in its spread and intensification.

INFLUENCE OF VARIOUS FACTORS UPON PER CENT OF INFECTION OF BLISTER RUST

It has become apparent from the data which have accumulated from the plot studies that the percentage of infection which develops in a stand of white pine is resultant of several factors. Each of these factors not only produces an individual effect upon the percentage of infection, but due to their interaction upon each other, produce an accumulative effect.

In order to obtain some suggestions regarding this problem the data for several of the plots have been statistically analyzed. As a result of this analysis the following factors have been found to have the most important influence on the per cent of trees infected: number of ribes, feet

of live stem, number of trees and slope of the topography. Their relative importance has not been determined.

Several tests of the data by approximation indicated that the relationship between these factors was linear or so nearly linear that analysis of the data by multiple linear regression would give some information regarding the influence and importance of the factors indicated above upon the percentage of infection. Table 3 gives a summary of the results obtained thus far by such an analysis. All data have been reduced to a per acre basis. The number of ribes per acre by species and the number of white pine per acre are given as an indication of the conditions on each plot. While the data for two of the plots showed a significant relationship; that is, that there was only one chance in twenty that the results occurred by chance, in six of the plots the correlation was very significant; that is, in 99 cases out of 100 the relationship indicated for the particular plot was representative for that set of conditions. In the last column is given the per cent of the rust (coefficient of determination) on the plot which is accounted for by the analysis.

The values obtained in the column for the effect of slope suggest a very definite influence on the percentage of infection, that is, a decrease in the percentage of infection, other factors being equal, for each chain up a slope on which the infection occurs. Likewise, every variation in the number of ribes feet of live stem or number of trees per acre influences the amount of infection as these factors increase or decrease in size. There is a considerable variation in the effect of each factor on the different plots, probably due to the difference in time the rust has been present, the various sizes of the samples which were taken as well as the various amounts of ribes and pine present on the plot area. Until a greater amount of data can be assembled, no definite conclusions can be drawn. Therefore, this data must be considered as only indicative of the fact that all of these factors may have a definite influence upon the percentage of infection which may develop. Further work of this nature might suggest more definitely the relative importance of each factor and thus make it possible to draw some conclusions.

TABLE 3

RELATIVE INFLUENCE OF SLOPE, NUMBER OF RIBES, FEET OF LIVE STEM AND NUMBER OF TREES PER ACRE ON THE PER CENT OF INFECTION

Plot	Ribes Per Acre		No. Trees Per Acre	Regression Equation					Standard Error of Estimate	Mult. Corr.	Signif-icance	Per cent Rust Accounted For
				Infec-tion a.	Increase in % Infection							
					Per Chain Up Slope	Per Each Ribes Per Acre	Per 10 F.L.S. Per Acre	Per 100 Trees Per Acre				
	Lac.	Vis.										
Newman Lake	22		60	75.81	Level	1.0342	.2680	53.24	14.14	.8751	S	76.6
Snake Creek	46	26	1,303	36.97	Level	.4416	.2178	.1980	16.80	.5740	VS	32.9
Bird Creek	291	158	6,419	47.90	-1.7457	.0644	.0084	.2390	11.68	.8780	VS	77.1
Crystal Creek I	5	199	429	93.92	-5.3543	.0461	.0009	6.6320	10.47	.9567	VS	91.5
Crystal Creek II	7	906	967	61.18	-1.3913	.1872	.0481	8.8560	21.12	.7501	VS	56.3
British Columbia	13		227	68.86	-2.3171	.0860	.0880	.2000	3.57	.9654	VS	93.2
Long Meadow	46	182	2,148	89.64	-4.6176	.9299	1.2035	1.5850	6.43	.9768	VS	95.4
Trail Creek	352		1,783	23.75	-1.8152	.0227	.1608	.8600	11.27	.7675	S	57.4

SUMMARY

The data in this report are a preliminary basis for the following suggestions:

1. About the same amount of disease was present on the ribes in 1940 as in 1939.

2. The great difference in susceptibility of R. lacustre, R. viscosissimum and R. petiolare is very evident.

3. The Powder House plot reveals the difficulty in locating the last few bushes on an area.

4. In open reproduction type the reduction of the ribes to an average of 1.7 bushes per acre may not give control of blister rust if the disease has already become established.

5. When blister rust has become established in an area R. lacustre, although a species of low susceptibility, is capable of developing enough rust to cause serious damage to white pine.

6. Ribes lacustre dwarf bushes may develop more rust in proportion to their live stem than larger bushes and appear to represent a real menace to white pine, therefore must be thoroughly eradicated.

7. The slope of the topography, number of ribes, feet of live stem and number of trees per acre all appear to have a definite influence upon the per cent of infection which may develop in a given time.

Preliminary reports have been issued to date on the following plot studies:

1. Report on Bird Creek Blister Rust Plot
2. Long Meadow Creek Plot
3. Report on Deep Creek Blister Rust Study Plot
4. Three Bear Creek Blister Rust Plot
5. Report of Data obtained on Crystal Creek Plot II
6. Report on Crystal Creek Plot I
7. Middle Fork St. Maries River
8. Report on Blister Rust Investigation on Snake Creek Plot.

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION AND PROGRESS OF RIBES ECOLOGY WORK IN THE NORTHWESTERN REGION FOR 1940

By
V. D. Moss, Assistant Pathologist
C. M. Chapman, Chief Scientific Aid

INTRODUCTION

The activities of the methods project in the Northwestern Region for the calendar year 1940 included further statistical work with the 1939 tagging data, checking of chemical and ecological studies, establishment of ecological plots, laboratory and greenhouse work at Berkeley, and the designing and testing of new eradication tools.

The developmental work in methods of ribes eradication consisted in making additional statistical studies of the 1939 tagging data. The conclusions, based on the analytical determinations, are presented in this report. The final report in body will appear at a later date as Serial No. 108. The results of 1938 rework of Ribes montigenum by hand, oil, and Atlacide in Colorado are shown, and comments are made on the 1937 chemical plot work in the states of Colorado and Wyoming. Some general comments on ribes regeneration in Colorado and Wyoming are also included. All of these data are presented in part I under the heading "Developmental work in methods of ribes eradication."

During 1940 no additional studies on the chemical eradication of ribes were undertaken in the Northwestern Region. Field inspections of stream type chemical mop-up work and the treatment of decapitated R. viscosissimum were made with borax-chlorate throughout the summer. Chemical problems were discussed with the operation supervisors. A mixture of borax-common salt is now recommended for the decapitation treatment instead of the borax-chlorate formerly used. The recommendations for chemical work in this region remain much the same as given for 1938 with the exceptions of minor changes shown in the 1939 and 1940 annual reports.

The ecological work described in part II of this report was the continuation of problems initiated in 1939 and the establishment of new plots to cope with the demand for additional information on grazing and forest management problems. The thorough investigation of three major grazing problems now confronts the methods project. The first of these studies will attempt to establish the most favorable time for the sheeping of recently cutover areas in relation to the eradication program. The second study will be used to determine the effects of deferring range use on areas previously grazed until adequate blister rust protection measures have been established. The third study will be used to measure the effects of known intensities of grazing on the development of ribes and western white pine. Progress on these studies is either reported for the first or second time in the 1940 annual report.

Two new one-acre areas were added to the upland ribes regeneration plot studies this past season on the Clearwater Forest. This now places

one or more of these plots on each of the blister rust operations in Idaho and Washington. One new forest ecological study was started this past season for the purpose of directly comparing the germination, growth and development requirements of the two major species of ribes and western white pine.

In the present report there is a list of the reports prepared in connection with laboratory and greenhouse work done at Berkeley during the winter of 1939-40.

PART I. DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION

The tagging of ribes before eradication

A study was conducted on two 40-acre tracts during the 1939 field season, one located on the Mount Spokane and one on the Kaniksu operation, to evaluate the effectiveness of ribes removal by the tagging and regular methods of ribes eradication. A preliminary discussion of the results of these studies was presented for the first time in the 1939 annual report on pages 123-133 inclusive, for the Northwestern Region. The final report, Serial No. 108, will be distributed early in 1941. A brief summary is presented in the present report in order to make available the more complete conclusions reached by additional statistical studies.

In the tagging procedure, the ribes were first marked with white mechanics waste by experienced crewmen to facilitate the identification and subsequent removal of the tagged bushes by the regular eradication crews. This proposed new method of ribes eradication was intended originally to serve as a means of prolonging the normal working season after ribes defoliation had commenced, thus compensating for loss of time spent on fire suppression. It was later suggested that the tagging work might reduce searching time, increase the efficiency of ribes eradication during the summer season, and permit the immediate use of inexperienced labor for ribes removal without the training period heretofore considered to be necessary for the identification of ribes and the maintenance of systematic crew formations.

The data obtained from the results of studies by first working, mop-up and check operations for each method on the two areas have been statistically analyzed to permit an accurate correlation to be made between the results and to permit an unbiased interpretation of the analytical findings. The conclusions presented in part 1 deal with the analysis of the first working operation; those in part 2 deal with the efficiencies of first working as determined by the number of ribes found by the mop-up and check operations.

Completion of the field work was made possible through the assignment of blister rust crews by the supervisors on the Mount Spokane and Kaniksu operations.

Part 1 - The analysis of first working.

The statistical determinations for the results of first working proved that the regular method was more effective in the conduct of ribes removal work than the tagging method on total populations. This decision was reached from the following facts:

1. The amount of working time expended on total ribes by first working was found to be slightly lower for the tagging method on high concentrations and much greater than the regular method on low concentrations of ribes. The method means were found to have been drawn at random from truly homogeneous populations on both areas studied.

2. The total number of ribes pulled per man-day by first working, estimated from the total number of ribes present, was found to be higher for the regular method on both the high Mount Spokane and low Kaniksu ribes populations. The variance ratio of the method means was found to differ non-significantly among themselves.

3. The correlation between mean ribes and mean man-days within methods proved the regular method to be far more effective in the conduct of first working on both the high and low concentrations of ribes. The variance ratio between means within methods proved these values to differ significantly among themselves.

4. The regression of mean ribes per man-day between methods on each 40-acre tract proved that the random sampling did not accidentally represent different samples of a truly homogeneous population. The tagging method was found to have a slightly higher mean value for the Mount Spokane test and a lower one for the Kaniksu area.

5. The variance ratio between classes for working time proved means to be drawn from homogeneous populations on the Mount Spokane area and to differ significantly among themselves on the Kaniksu area.

6. The variance ratio between methods for working time proved means on the Mount Spokane and Kaniksu areas to differ significantly among themselves. The tagging mean was found to be slightly lower than that for the regular method on the Mount Spokane area and higher on the Kaniksu test.

7. Abandoning the class criterion of classification, the variance ratio determined for the number of ribes pulled per man-day proved the method means on the Mount Spokane test to differ significantly among themselves, and on the Kaniksu to be drawn from homogeneous populations. The regular method had lower values in seven out of 12 classes on the Mount Spokane area and higher values in nine out of the 11 classes for the Kaniksu tests.

8. Calculating the variance ratio for ribes per man-day without eliminating the class variation from the estimate of error, showed that the method means on both the Mount Spokane and Kaniksu tests were drawn from

heterogeneous populations. The class means on both Mount Spokane and Kaniksu tests were found to have been drawn at random from truly homogeneous populations. In comparison with tagging, the regular method was observed to have a lower mean on the Mount Spokane and a higher mean on the low ribes concentrations of the Kaniksu area.

9. The cost of $1.14 per acre for the Mount Spokane test and $0.28 per acre for the Kaniksu test for the white mechanics waste must be included as a charge against the tagging method.

Part 2 - The efficiency of first working.

The efficiency determinations between methods for first working proved the regular method to be superior to the tagging method in that fewer numbers of ribes were left on the areas after the initial eradication. This conclusion was based on the following facts:

1. Abandoning the class criterion of classification, the variance ratio showed that the method means for the percent of ribes missed per acre must have been drawn from truly homogeneous populations for the Mount Spokane tests. The regular method was found to have lower percentage values in 10 out of 12 possible population classes.

2. Recalculating the variance ratio for the percentage of ribes missed between method means without eliminating the class variation from the estimate of error for the Mount Spokane test, proved the class means to differ significantly among themselves and the method means to have been drawn from truly homogeneous populations. The regular method was observed to have a lower mean value of approximately 33 per cent for that attained by the tagging method.

3. Abandoning the class criterion of classification, the variance ratio for the Kaniksu test proved the method means to differ significantly among themselves. The regular method was represented by lower percentage values in eight out of 11 possible population classes.

4. Recalculating the variance ratio for the percentage of ribes missed between method means without eliminating the class variation from the estimate of error for the Kaniksu test proved the method means to differ significantly among themselves and the class means to have been drawn from truly homogeneous populations. The regular method was observed to have a method mean value of approximately 15 per cent lower than that attained by the tagging method.

RESULTS OF 1938 REWORK OF RIBES MONTIGENUM BY HAND, OIL, AND ATLACIDE IN COLORADO

On August 30, 1940, a check was made of the 1938 rework on Bison Ridge, Pike National Forest, Colorado. Thirty chains of check strip, one chain in width, were run across the area in south and west directions. A meandering check of 22 chains (one chain wide) was also made. On the total

area of 52 square chains examined for ribes, some 10 R. montigenum resprouts were found which had 136 feet of live stem. On the same area, 43 R. montigenum seedlings were found. Of these, 26 were of 1938 origin and 17 of 1939 origin. No current season seedlings were noted. From these figures it may be concluded that the 1938 hand rework on R. montigenum was successful and should be adequate for control.

Hand and chemical rework on Eagle Mountain was also checked on August 30. A 10-chain strip through the hand-worked area showed one R. montigenum resprout with 20 feet of live stem, and one R. montigenum seedling of 1938 origin.

Neither the oil nor the Atlacide rework on Eagle Mountain came up to control standards. On 14-1/2 chains of check strip through the Atlacide area, 71 missed and partly killed R. montigenum bushes were found. On 7-1/2 chains through the oil area, 23 R. montigenum were found. Table 1 shows the comparative efficiency of rework on R. montigenum by hand, oil, and Atlacide.

TABLE NO. 1

THE COMPARATIVE EFFICIENCY OF HAND, OIL, AND CHEMICAL REWORK ON R. MONTIGENUM, PIKE NATIONAL FOREST, COLORADO

Location of Work Block	Acres of Check Strip	Ribes Per Acre	F.L.S. Per Acre	Type of Eradication
Bison Ridge	5.2	1.9	26.2	Hand
Eagle Mountain	1.0	1.0	20.0	Hand
Eagle Mountain	1.4	50.6	2,210.0	Atlacide
Eagle Mountain	0.8	28.8	522.0	Oil

The killing action of the oil appeared to be generally satisfactory. Of the 418 feet of live stem which were found on the 0.8 acre of check strip, 250 feet of live stem were represented by two bushes which were not treated. The Atlacide was quite ineffective possibly because of the dilution caused by heavy autumn rains which occurred within a few days of the treatment in 1938. Dilution becomes a highly significant factor in the coarse gravelly soils typical of the granitic uplands of the Pike Forest. The oil tended to remain in the surface horizons of soil and did not leach away as rapidly as the highly soluble Atlacide. All work was done by WPA crews.

Comments on 1937 chemical plot work in Colorado and Wyoming

1. Diesel oil - Spray and soil drench of intact R. montigenum.

Bison Divide, Pike National Forest (see tables 6 and 7, pp. 134 and 135 of the 1938 annual report). No change in effectiveness. A small amount of dieback took place in 1939 but none was apparent for the 1940 season. Oil still detectable in the soil immediately contiguous to dead crowns. Generally satisfactory kill.

2. Atlacide - Spray and soil drench of intact R. montigenum.

Bison Divide, Pike National Forest (see table 7, p. 135 of 1938 annual report). No change in effectiveness. Results slightly less satisfactory on score of kill than Diesel oil. No further mortality occurred during 1939 or 1940.

3. Atlacide - Spray and soil drench of intact R. cereum (see table 7, p. 135 of 1938 annual report).

In 1938 a 93 per cent bush kill (5 live and 65 dead) was reported. In 1940, one sprouting bush and 62 dead bushes were found. On the basis of the 1940 check, a bush kill of 98.4 per cent was obtained. Four of the partially killed bushes had died during the 1939 season.

4. Sodium ethyl xanthate - Drench of decapitated R. cereum crowns (see table 6, p. 134 of 1938 annual report).

One bush reported as alive in 1938 was dead when 1940 check was made. No essential change in the kill during 1939 and 1940 and this chemical is still reported as unsatisfactory for ribes eradication work.

5. Diesel oil - Drench of decapitated R. cereum crowns.

Plot work and crew work were checked on Pike National Forest and Medicine Bow National Forest. Kill in 1940 still averaged 98-100 per cent as shown in table 5, p. 133, of the 1938 annual report, and as stated in the first paragraph on p. 170 and as shown in table 9 on the same page of the 1937 annual report. No delayed sprouting had occurred during the 1939 and 1940 seasons even from the largest composite crowns in rocky sites. Two sprouts were noted among 350 treated crowns.

6. Common salt - Spray and soil drench of intact R. cereum.

No apparent change from results given in table 7, p. 135, of the 1938 annual report. Bush kill about 15 per cent.

7. Diesel - Spray of R. inerme and R. cereum sprouts in talus slope (see table 16 of the 1937 annual report).

Work done by WPA crews. Results unsatisfactory. In 1940 there were 51 R. inerme sprouts and 10. R. cereum sprouts on a half acre of talus slope in the treated area.

General comments on ribes regeneration in Colorado and Wyoming

The ribes regeneration plots summarized in table 2 were established during the 1936 field season at several localities within Colorado and Wyoming control units. Although these plots are not adequate for a sampling of the ribes regeneration in Colorado and Wyoming, the data from these plots may be properly added to the fund of general observations made by Offord and

Chapman. The following comments are made chiefly on the results of random inspections of the various control units: (1) One working of R. montigenum will not place areas on maintenance. After initial work, the major regeneration occurs from broken crowns and layering stems. Seedlings will not be a problem in rocky upland sites in Colorado but may become one in the richer, deeper soils of upland draws in Wyoming. A second working of R. montigenum, if carefully done, should place areas on post check or maintenance, especially so in the rocky upland areas of Colorado. Shady draws and stream type should be watched for regeneration from seed. (2) The work on R. cereum has been highly effective except in loose rock jumbles where it was not possible to decapitate and treat individual crowns with oil. R. cereum appears to present little or no regeneration problem from duff-stored seed. The decapitation and oil treatment of large rock-bound R. cereum has been particularly satisfactory. No seedlings were visible around any of the decapitated and oiled crowns. Satisfactory control of R. cereum has been obtained in all sites where soil conditions permitted the bushes to be dug or pulled by regular methods. (3) The problem of R. inerme in willow swamps and its regeneration under these conditions is essentially the problem that has been successfully worked out in north Idaho. Inspection of willow-R. inerme sites in Colorado and Wyoming indicates that several workings will be needed to reduce this ribes species to control standards if hand methods only are used. Unless the present opposition to the use of mechanical methods in this region could be overcome, the task of permanently suppressing R. inerme would be a difficult one. The eradication of R. inerme from rock jumbles along talus slopes has not been satisfactorily accomplished. Fortunately these sites are not extensive in size or in number. (4) The 1940 inspection in Wyoming and the checking of previously established regeneration plots did not furnish any significant data or pertinent comments on the regeneration of R. lacustre, R. viscosissimum, and R. leptanthum. These three species occurred only in the Wyoming control area and were of minor importance in the initial eradication work.

In table 2 a summary is given of the regeneration data taken by Offord and Chapman. These data show what has actually occurred on a few selected spots but are not sufficiently extensive in themselves to form the basis for broad gauge conclusions or recommendations. Data shown in table 2 have been condensed from five detailed tables on file at Berkeley and Spokane.

TABLE NO. 2

REGENERATION OF RIBES IN COLORADO AND WYOMING, AS SHOWN BY GROWTH DATA AND SEEDLING COUNTS MADE IN 1937 AND 1940

Ribes Species and Locality	Number of Separate Plots	Area Disturbed (Sq. Ft.)	Linear F.L.S. Removed by 1936 Eradication	Ribes Conditions as Shown by 1937 Check	Ribes Conditions as Shown by the check of Aug. 28, 1940
R. inerme, Medicine Bow NF	15	280 1/	2,340	101 F.L.S. 338 seedlings	54 F.L.S. 78 seedlings
R. inerme, Washakie NF	2	52 2/	250	No sprouts 98 seedlings	No sprouts 25 seedlings
R. lacustre, Washakie NF	1	16	300	4 F.L.S. 5 seedlings	2 F.L.S. 2 seedlings
R. cereum, Medicine Bow NF Happy Jack	1	128	1,000	10 F.L.S. 66 seedlings	16 F.L.S. No seedlings
R. cereum, Medicine Bow NF Camp Blair	4	No dist. 3/	None	420 seedlings	26 seedlings
R. montigenum, Pike NF	2	112	2,400	6 F.L.S. 52 seedlings	46 F.L.S. 12 seedlings
R. montigenum, Pike NF	1	128	3,000 4/	26 F.L.S. 5 seedlings	248 F.L.S. 15 seedlings
R. montigenum, Washakie NF	1	240	1,000 4/	6 F.L.S. 6 seedlings	56 F.L.S. 10 seedlings

1/ Includes 64 sq. ft. of plots treated with common salt in 1937 on which no seedlings were subsequently found.

2/ Salt applied to 4 sq. ft. of one plot in 1936. Seedlings occurred on this treated area in 1937.

3/ One plot of 16 sq. ft. was treated with common salt in 1937 and still had 12 seedlings in 1940.

4/ Eradication work done in 1935.

LABORATORY AND GREENHOUSE WORK, NOVEMBER 1939 TO MAY 1940

Laboratory and greenhouse work undertaken at Berkeley during the winter of 1939-40 included: (a) routine care of the ribes garden and the greenhouse; (b) conduct of self- and cross-pollination tests on ribes garden plants; (c) preparation of special photographic material for research reports; (d) continuation of ribes seed germination tests. A brief statement giving the practical significance of the findings is here appended to each of the special reports completed during the period November 1939 to May 1940.

Serial No. 104

The Function of Tannin in Host-Parasite Relationships With Special Reference to Ribes and Cronartium ribicola.
-- H. R. Offord

This report gives a subject matter summary of all data pertaining to the tannin content of ribes species. By distributing this report to technical workers in universities and experiment stations, we hope to stimulate academic research on the mechanism of disease resistance in ribes and Cronartium ribicola.

Serial No. 105

The Use of Ropes in Ribes Eradication Work. -- L. P. Winslow

A reference manual which provides a convenient summary of data relating to: the strength and care of rope, methods of tying knots useful in camp and field work, and instructions for the care of workers along cliffs and other hazardous places. Descriptions are given of safety slings and a specially devised mechanical safety catch for safeguarding a worker suspended on a rope.

Serial No. 106

Fluids for the Preservation of Flowers and Fruits.-- C. R. Quick

Describes results of five-year tests on solutions for preserving the color of flowers and fruits of various ribes and recommends the following all-purpose preservative: 100 cc. of solution containing six cc. formaldehyde (40%), 25 cc. boric acid (4%), four cc. copper sulfate penta-hydrate (10%), four cc. ethyl alcohol (95%) and 61 cc. water.

Serial No. 107

Experimental Germination of Ribes Seeds. Series of 1939.
-- C. R. Quick

Reports seed germination tests in various soils collected from white pine areas in Idaho, Oregon, and California. Data show that there was no soil which prevented ribes seed from germinating. The growth rate of

seedlings and the green weight of seedlings grown in the various soils were generally high for those cultures which showed highest germination of seed. No consistent relationship was shown between the ribes population of the soil as collected in the field and the ability of that soil to grow ribes seedlings under experimental conditions.

Papers published during 1940, or those approved for outside publication, are as follows:

"Chemical and Mechanical Methods of Ribes Eradication in the White Pine Areas of the Western States."
--H. R. Offord, G. R. Van Atta, and H. E. Swanson.
U.S.D.A. Tech. Bull. No. 692, Jan. 1940.

"Blister Rust Control in the Management of Western White Pine."
--Kenneth P. Davis and Virgil D. Moss.
Station Paper No. 3. Nor. Rocky Mountain For. & Range Exp. Sta., June 1940.

"A Key to the Ribes of California." -- Clarence R. Quick.
Bur. Ent. & P. Q. MS 5166, Berkeley, Calif. Oct. 15, 1940.

In the spring of 1940, tests were made on the hand pollination of R. roezli, R. glutinosum, and R. gracillimum growing in the ribes garden at Berkeley. These tests, as well as those subsequently made in the field in California and Idaho, show that ribes seldom, if ever, produce mature fruits as a result of self-pollination. A report on this work is given by C. R. Quick in section 3 of the 1940 annual report for the Sugar Pine Region.

STATUS OF RECOMMENDATIONS ON SPECIAL METHODS OF RIBES ERADICATION AND NEW DEVELOPMENTS OF 1940

Recommendations

No changes are made in recommendations for methods and equipment given as items (1) to (5):

(1) Light or medium weight claw mattock.
(2) Use of dynamite.
(3) Broadcast spraying with Atlacide or Diesel oil.
(4) Bulldozer methods for brush removal in stream type.
(5) Use of D-2 Caterpillar tractor equipped with front end brush rake and rear end power hooks.

For a description of these methods and recommended equipment, reference should be made to the 1939 annual reports for the Sugar Pine and Northwestern Regions.

Decapitation and chemical treatment of ribes. Recommendations are the same as given in 1939 report for oil work and for methods of applying dry chemical. In the latter, however, a new formula is given. Use a mixture of

one part by weight of borax (tech. powder), and one part by weight of common salt (vacuum refined table and dairy salt).

Developments of 1940

In reviewing the results of the 1940 field season, the following observations and conclusions refer briefly to the newer developments which may find practical application in the control of blister rust.

No special comments are made at this time regarding the bulk of the ecology studies (ribes regeneration in relation to fire, logging, timber management, and eradication methods).

(a) Results of pollination tests on ribes flowers definitely show that wild ribes are rarely, if ever, self-fertile and that cross-pollination must occur before such plants can produce mature fruits. This conclusion has an important bearing on long-range planning of eradication work and gives promise that continued man-caused reduction in ribes populations should be aided in its final stages by natural phenomena.

(b) Results of the 1939 tests with dry chemical offer for consideration a mixture of dry borax and common salt as a definite improvement over the chlorated borax or straight borax as previously recommended. The new mixture of borax and common salt should have wider application in all regions, especially on National Park land where considerable importance is attached even to a rumor that a chemical may be toxic to wild life. The new mixture has the further advantages of being cheaper and easier to handle than the one previously used.

(c) Several new tools of the peavey type have been tested and found useful for eradication work in thickly populated stands of R. roezli (or any ribes difficult to dig) where the work is heavy and slow with the regular mattock.

(d) The investigations that were made regarding the operation of the small trail tractor designed by Region Six of the Forest Service have drawn our attention to a type of equipment which conceivably would make an effective contribution to the blister rust program for camp construction work, for the servicing of small camps away from motor roads, for construction of trails, for cutting manways in brush fields, and finally, for the actual eradication of large troublesome ribes. One of these special tractors equipped with a single drum logging winch and a brush rake (to be replaceable with a mull board for trail construction) would cost $[illegible],000. It is to be hoped that either the Bureau or the Forest Service can assign such a tractor to blister rust work in the Far West during 1941.

(e) The effectiveness of hand grubbing work was improved by employing the D-2 Caterpillar tractor to make manways across troublesome brush fields. Manways were cut some six weeks ahead of the regular crew eradication work, thus permitting broken-off ribes crowns to sprout.

PART II. ECOLOGY STUDIES FOR 1940

The effects of variable light and moisture conditions on the germination, growth and development of R. viscosissimum, R. lacustre, and Pinus monticola.

In the western white pine region it has always been difficult to explain for a given area, (i.e., one undergoing stand improvement practices, commercial logging and ribes eradication) the ecological reaction of ribes and white pine seedlings under the wide range of environmental conditions represented. Oftentimes, it has been observed or reported that one species of ribes appeared to be developing far better than the other, or that both species were noticed to be developing in about the same manner. In other cases, ribes appeared to be more vigorous than the white pine seedlings, or the pine appeared to be in a healthier state than the associated ribes. Since no intensive study has ever been made for the purpose of segregating the germination, growth and development requirements of the two major species of ribes and western white pine under the same environmental field conditions, it has been impossible to answer many of the above questions relating to growth requirement. Before further recommendations can be made on the extent to which forest management may aid or impede the suppression of ribes, it was considered necessary to undertake an intensive controlled study to determine the light and moisture requirements of white pine and the two most troublesome species of ribes. If noticeable differences are found to exist either between the two ribes species or between ribes and white pine, then management may find it possible to give even greater aid in the suppression of ribes than is now made possible from the present ecological knowledge. Such information will also greatly aid in the solution of problems on the regeneration of ribes subsequent to eradication work.

After an exhaustive search had been made throughout the white pine region of northern Idaho, an area was finally located in the Kaniksu Forest which met the requirements of an adequate site in which environmental conditions were suitable for the proposed tests. The area selected is known as the Hannah pre-logging disposal unit. On this unit all defective and unmerchantable trees have been felled and the flash fuel piled and burned. Three variable light stations were selected in or near the pre-logging unit. Station 1, representing a full sun site, and station 2, representing a half shade condition, are within the pre-logging block. Station 3, a full shade station, lies north of the pre-logging unit in an identical but virgin stand of timber. The topography, soil and forest floor conditions are considered to be adequately uniform throughout the three stations. The Hannah area represents a level terrain of glaciated deposits.

Each of the three light stations is represented by three plots. The surface of plot 1 is composed of natural undisturbed duff cleaned only of debris and shrub growth. The surface of plot 2 represents mineral soil which was obtained by removing the duff and humus layers. The surface of plot 3 represents a burned-mineral condition. This latter series was obtained by piling for the most part flash fuel over the natural site and burning until practically all the organic mantle had been consumed down to mineral soil. These three surface conditions, duff, mineral and burned-mineral, represent the three major types of soil surface found in the white pine type.

The variations of any one classification can largely be determined by an adequate statistical analysis of the results obtained from the germination, growth and development studies of ribes and white pine on the three major surfaces.

The exterior dimensions of each plot were first trenched to a depth of two feet or more in order to cut off all root competition. In so far as practicable, this assured control and uniform distribution of moisture throughout the plots. The individual plots were next fenced with 3x3 mesh hardware cloth to guard against rodent damage. This cloth was buried to a depth of 10 inches in the trench before covering, had a surface height of 18 inches, and then flanged outward at a right angle for a distance of eight inches. The eight-inch flange served to prevent rodents from entering the plots if they crawled up the 18-inch surface fence. Over the top of these rodent-proof pens were placed removable covers constructed of wooden frames and covered with one-inch mesh chicken wire. These covers served to prevent birds or large rodents from entering the plots after the seed had been sown. Late in the fall of 1940, these chicken wire covers were removed and the protection replaced by laying ordinary screen directly over the seedbeds. This was done to prevent heavy snows from crushing the covers and pens and to give protection to the seedbeds during the winter in case rodents or birds entered the plots. This screening will be removed the first thing next spring and the covers replaced for the growing season. All the labor used in the construction of the rodent- and bird-proof pens, as well as the material for the wooden frames, was furnished by the Forest Service, for which grateful acknowledgment is made.

Each plot was subdivided into twenty two-foot adjacent squares, five squares or subplots long and four wide. The accompanying photographic illustration shows the arrangement of two-foot square seedbeds. A one-foot buffer strip was placed around the subplots between the seedbed and the fence. At one end of the plot three ten-inch adjacent strips, running the width of the plot, were established with a buffer strip between the fence and also between the strips and the subplot seed beds. These strip plantings are to be used for the purpose of studying the development of roots for the two species of ribes and for white pine seedlings. The boundaries of each subplot and the strips were laid off with string lines. The wooden stakes used to mark the boundaries were all placed in position and properly adjusted in the buffer strips. This was done for the purpose of utilizing all available seedbed space and to keep all foreign material directly out of the subplots.

The seed of R. viscosissimum and R. lacustre was collected and extracted from the fruits about the middle of August. The fruits of R. viscosissimum were collected off the Pyramid Pass area, and those of R. lacustre off the Pass Creek Pass area, both being located in the Kaniksu Forest. After the seed had been extracted, dried and thoroughly cleaned, it was stored at room temperatures until the date of sowing. The pine cones were collected about the 25th of September from the Granite Creek area also located in the Kaniksu Forest. The seed was extracted from the cones by kiln drying at a temperature of 122° F. This work was done by the Forest

Service Savenac Nursery located at Haugan, Montana. Germination tests will be conducted for all samples of seed at the Berkeley laboratory.

Having practically no information on the percentage of new ribes seed germinating under field conditions, it was decided to sow both species of ribes at the rate of 800 seeds per square foot. This should insure adequate germination and at the same time, if germination should become too heavy, permit the number of seedlings to be thinned until a desired population is reached. The samples of 800 seed were obtained by first counting out five groups for each species of ribes. Each group was then measured in a graduated vial and the mean height of the five samples used as the basis for measuring field samples at the time of sowing. During the course of seeding, 10 measured groups of seed for each species of ribes were selected at random and later counted to determine the percentage plus or minus variation from 800. The measurement of the 10 counted groups for each species was found to vary less than one per cent. The mean variation for R. viscosissimum showed a plus of .03 per cent, and for R. lacustre a plus variation of .05 per cent. The white pine seed was counted out by groups of 100 seed and packaged before going into the field. Each package of 100 seed was then used to sow an area of one square foot.

The random method of subplot selection was used to determine what each two-foot square was to represent. This was accomplished by taking one-inch square pieces of cardboard and writing on the words, R. viscosissimum, R. lacustre, Pinus monticola, and check. These cardboards were then placed in a tall can and shaken before each draw. After one card was removed it was not replaced until all four cards had been taken. Drawings for subplot locations were done for the widths of the plots, since each plot was four subplots wide. Maps were made before the drawings and these showed the arrangement of the subplots and also the three 10-inch strips at one end. As each card was withdrawn from the can, the name shown on the card was written on the subplot selected. This was continued until all subplot blanks had been filled in and the selection of seed made for the 10-inch strips. The drawing for subplots always commenced in the left hand corner at opposite ends from the 10-inch strips. Each plot map was completely filled in before going into the field.

A two-foot square lath frame was constructed and subdivided into one-foot squares marked off with a light copper wire. This frame was placed over each subplot to permit the seeding by exactly one-foot squares. An assistant measured out the ribes seed which was checked by the author before sowing. The ribes seed was sown by running the seed gradually over the forefinger with the use of the thumb. This permitted an equal distribution of the seed over the surface to be sown. The exterior boundaries of each one-foot square were first sown in order to obtain uniform distribution along the margins and at the same time keep the seed within the boundaries of the subplot. This method of sowing ribes seed not only proved to be quite rapid but very satisfactory in obtaining a uniform distribution over the entire one-foot square surface. The pine seed was sown by dropping individual seed approximately one inch apart. This method seemed to be the only way in which a uniform distribution could be obtained over the surface to be sown. The

LIGHT MOISTURE STUDIES

Full Shade Station

Duff Plot

0 1 2 FEET

Germination, Survival and Development Seed-bed Studies

Ribes Viscosissimum	Ribes Lacustre	Check	Pine
Pine	Ribes Viscosissimum	Ribes Lacustre	Check
Check	Ribes Lacustre	Ribes Viscosissimum	Pine
Ribes Lacustre	Pine	Ribes Viscosissimum	Check
Ribes Viscosissimum	Check	Pine	Ribes Lacustre

Root-development Seed-bed Studies

Ribes Viscosissimum
Pine
Ribes Lacustre

10-inch strips were sown at about the same rate except the seed was neither counted nor measured. The seeding of the plots commenced on October 28, and was completed on October 31. Seeding before this date in the burned-mineral plots was made impossible because the fire restrictions of the region were not removed until the 15th of October.

Hydrogen-ion determinations were made for three soil samples of each plot at the three light stations. These were obtained for the surface, six-inch, and 12-inch layers. The soil samples were collected and sent immediately to the Berkeley laboratory where the pH tests were made December 6-9. Just before sowing, samples will be taken each year at about the same time. The results of the pH determinations are shown below for the plots of each light station.

TABLE NO. 3

pH MEASUREMENTS OF SOIL SAMPLES TAKEN FROM HANNAH ROAD PLOTS, LIGHT CONDITION AND SOIL SURFACE AS SHOWN

Full Sun Station					
Duff Plot	pH	Mineral Plot	pH	Burned-Mineral Plot	pH
Surface sample	5.04	Surface sample	5.99	Surface sample	7.49
6-inch sample	5.57	6-inch sample	5.67	6-inch sample	5.59
12-inch sample	5.79	12-inch sample	5.92	12-inch sample	5.62
Half Shade Station					
Surface sample	5.29	Surface sample	5.79	Surface sample	7.22
6-inch sample	6.01	6-inch sample	5.97	6-inch sample	6.05
12-inch sample	5.90	12-inch sample	5.72	12-inch sample	5.92
Full Shade Station					
Surface sample	5.36	Surface sample	6.01	Surface sample	7.20
6-inch sample	5.92	6-inch sample	5.88	6-inch sample	5.58
12-inch sample	5.90	12-inch sample	5.63	12-inch sample	5.92

It is interesting to note that the alkaline concentration of surface samples for the burned-mineral plots increased from full shade to full sun stations. This trend follows exactly the ease with which the slash was burned to consume the organic mantle down to mineral soil. It was necessary to refuel and burn the half shade and full shade plots three times before most of the organic mantle disappeared, whereas, the full sun station required only two burnings. Another interesting point is noticed in regard to the differences of the surface samples for the duff plots. The highest acid (i.e., lower pH) condition was found to be present on the full sun station, and this concentration decreased as the amount of shade increased. The six-inch and 12-inch samples show variations which have been influenced by the composition of the decaying organic mantle.

These studies of the light and moisture requirements of ribes and western white pine seedlings will continue over a period of five years. During this time, information will be taken on the germination of seed, survival of seedlings and their growth and development. Root studies will also be made of the two species of ribes and western white pine which have been

planted in the 10-inch strips. The soil moisture content will be measured for each plot at about ten-day or two-week intervals during the growing season. A number of other observations, such as soil temperatures and air temperatures, will be made on the plots in cooperation with the Northern Rocky Mountain Forest and Range Experiment Station.

The effect of grazing by sheep on the germination, growth and development of ribes and western white pine on recently cutover areas.

This study was described for the first time on page 138 of the 1939 annual report for the Northwestern Region. Since the 1939 field season, the scope of the grazing studies has been greatly extended to meet the demand for additional information and a larger sampling of the grazing problem. One additional exclosure was established on the Clearwater and two new plots on the St. Joe Forest this past season. There are now a total of three grazing exclosures on the Clearwater and two under observation on the St. Joe Forest. Plots 1 and 2 are located about 1/2 mile west of the blister rust headquarters, and plot 3 about two miles northwest of Pierce, Idaho. All three of these plots are located in the Clearwater Forest. Plots 4 and 5 are located in the St. Joe Forest on Scaler Creek in the upper drainage of the St. Maries River. These five plots now represent both the early and late season grazing units as well as the wide range of grazing conditions on the two forests.

The purpose of establishing these studies on recently cutover lands is to determine the effect of sheeping on the germination, growth and development of ribes and western white pine in relation to the control of blister rust. Each exclosure has been established on a cutover area prior to any grazing but long enough after logging to permit the bulk of ribes seedlings to appear from the major disturbance. Observations will be made on these plots for at least five years in order to study the effects of sheeping on new germination and survival of seedlings on each year's growth and ultimately on ribes fruiting.

The results of preliminary observations on many of the grazing units located in the Clearwater and St. Joe Forests have shown certain facts to be true in regard to the effects of sheeping. Dependable conclusions, however, cannot be drawn without intensive studies over a period of years. Early studies have indicated that sheeping results in a material loss of leaves, terminal buds, and some loss of live stem, and that an occasional ribes is destroyed. Nothing is known, however, of the possible increase of new ribes caused by sheeping, or the increase in leaves, main stems, laterals, total live stem, and height of bush. If eradication difficulties are also enhanced, the total effect of sheeping may substantially intensify the blister rust hazard on recent cutover areas. The results of one or even two seasons of intensive grazing observations cannot hope to answer many or all the grazing problems, the reason being that the extent of browsing or disturbance does not remain constant for any one year but varies with the time of day, day of the grazing season, and finally, with the composition of the band of sheep on the area. Early morning or late evening grazing is known to be much more complete than midday. The taste or selec-

tion of browsed plants varies throughout the grazing season. The extent to which ribes are browsed depends upon plant associations as well as the degree to which the range has been utilized. The degree of browsing depends a great deal on the composition of the band, whether it is composed entirely of ewes, entirely of lambs, or of various proportions of the two. Early data obtained from these series of studies can only hope to point out or indicate particular trends resulting from the effects of sheeping on recently cutover lands.

The data obtained from a two-year study of plots 1 and 2 located on the Clearwater Forest are shown in table 4. The effects of sheeping to date on ribes have shown a possible increase of main stems, a noticeable increase of laterals, total feet of live stem, and a greater number of leaves per browsed bush. Responsible for this morphological increase has been the browsing of terminal buds. Each terminal bud nipped in 1939 has been followed by new laterals or an occasional main stem in 1940. The immediate effects of sheeping have been a small loss of total ribes, a slight decrease of live stem, and heavy browsing on both the leaves and terminal buds. Just how sheeping will ultimately affect the germination, growth and development of ribes can only be determined by studying means and deviations over a period of years.

TABLE NO. 4

THE RESULTS OF TWO SEASONS' GRAZINGS
ON THE DEVELOPMENT OF RIBES
IN THE CLEARWATER FOREST

Plot Number	Date Checked	Total No. Ribes	Main Stems		Laterals		Total FLS	Ave.Ht. Per Bush in Ft.	Leaves		Terminal Buds	
			No.	FLS	No.	FLS			Total	Per Bush	Total	Per Bush
Exclosure-1	9/21/39	79	81	27.56	63	3.62	31.18	.19	553	7.0	144	1.8
(Not grazed)	9/25/40	78	86	30.93	76	9.96	40.89	.35	858	11.0	155	2.0
Check - 1 (Grazed)	9/21/39	95	97	33.98	109	7.88	41.86	.32	817	8.6	206	2.2
	9/27/39	92	94	30.26	104	7.05	37.31	.31	361	3.9	182	2.0
	9/25/40	89	96	48.48	244	53.05	101.53	.63	2,067	23.2	303	3.4
	10/7/40	89	96	47.82	244	51.44	99.26	.61	1,103	12.4	292	3.3
Exclosure-2	9/22/39	35	38	13.78	46	4.23	18.01	.33	308	8.8	84	2.4
(Not grazed)	9/26/40	35	41	21.03	59	10.73	31.76	.52	464	13.3	96	2.7
Check - 2 (Grazed)	9/22/39	26	32	14.52	32	2.89	17.41	.36	237	9.1	64	2.5
	9/28/39	19	25	11.79	30	2.35	14.14	.34	134	7.1	48	2.5
	9/26/40	17	30	24.55	67	6.70	31.25	.78	526	30.9	94	5.5
	10/8/40	17	30	23.64	67	6.28	29.92	.77	311	18.3	86	5.1

Other information being recorded by these studies is the disturbance responsible for ribes germination, year of origin of each bush, new main stems and new laterals. The amount of new live stem growth is being recorded each year as is the height of bush. The total number of leaves are taken at each check, the number browsed immediately after the area has been

grazed and the per cent of leaf surface. Each exclosure is checked twice during the growing season. The first check is made the early part of June and the second or fall check during the month of September. The controls are checked three times each season. If the area is to be sheeped early, the plots are checked before and after grazing plus the mid-September check. If the area is to be sheeped late, the controls are checked first in June and then before and immediately after grazing which is done about the middle of September. The dates of grazing and the composition of the bands, the number of ewes and lambs, are recorded each season. The forage density and height of browsed material were first taken before the sheep entered the new grazing units. This information is then recorded each year in early June and late September in order to determine the percentage of forage browsed in relation to the damage of ribes and white pine. Complete information is being taken at the times ribes are checked on new white pine germination, mortality and injury which is classed as resulting from browsing or trampling. The Northern Rocky Mountain Forest and Range Experiment Station is cooperating on these studies by recording the effects of sheeping on all coniferous reproduction. It is interesting to note that to date, no damage has been observed on white pine reproduction where grazing was restricted to less than 50 per cent of the carrying capacity of the areas. Grazing above this percentage figure has resulted in some terminal bud nipping which becomes heavier as grazing increases above the carrying capacity of the areas. Trampling does not become serious except along driveways, on overgrazed areas and on steeper slopes.

The ribes data obtained from one year of grazing on plots 3, 4, and 5 show almost identical trends as did the results for plots 1 and 2 shown in table 4. One interesting observation that has been made on many of the plots is the number of terminal buds nipped by deer. Out of a total of 664 terminal buds recorded on the control of plot 5, sheep had nipped 247 buds and deer 125. This information is carefully segregated for all the controls in order to determine the effects of both sheep and deer on the ribes suppressional problem. Another point of considerable interest in regard to the browsing of leaves early in the season is that secondary or axis buds appear shortly after the leaves are removed, and in many instances two leaves replaced the loss of one. This was especially noticeable where R. lacustre had been heavily browsed. Complete information on these studies will be presented in the 1941 annual report after all controls have been subjected to at least two years of grazing.

The effects of deferred grazing on the germination, growth and development of ribes and western white pine.

This study was started during the 1940 season for the purpose of attempting to establish the most favorable time of grazing on recently cut-over areas in relation to the eradication program. It has been rather a common occurrence in the past to have most of the recently logged areas sheeped for a number of years prior to and before adequate blister rust protection measures could be applied. Just how seriously, if at all, this procedure has affected the efficiency of ribes eradication is not known. It is the common belief, however, that sheeping is responsible for the

large portion of stunted ribes bushes occurring on these areas. The dwarfing of ribes bushes is caused by the constant nipping of terminal buds. The extent to which sheep will nip terminal buds has been observed to depend upon the severity of grazing. On areas now badly overgrazed, this problem of stunted bushes is found to be most common and troublesome.

There are two important questions relating to the time of grazing on recently logged areas in the western white pine type. Should sheeping be allowed on cutover areas before or after adequate blister rust protection measures have been applied? This question is being studied on the Clearwater and St. Joe Forests from the five exclosures and controls established on recently logged areas which have not as yet been grazed. The second question deals with the correlation of grazing with the eradication of ribes from areas which have been sheeped for a number of years. On many of these areas, it has been difficult to obtain adequate protection because of the large number of small and stunted ribes bushes which are troublesome for the eradication crews to find. This study of deferred grazing will compare the development of ribes within exclosures which have been previously browsed for a number of years with the ribes development on the controls which will continue to be browsed.

Two exclosures were established on the Hollywood area in the Clearwater Forest. These exclosures will defer grazing of ribes, western white pine, and all other associated plants. A total of 39 ribes were found in exclosure 1, and 44 ribes in exclosure 2. Two controls of equal size have been established for each exclosure. This was done in order to obtain about equal numbers of ribes and pine on areas subjected to grazing and on those deferred from grazing. The controls for exclosure 1 have 34 ribes, and the controls for exclosure 2 have 60 ribes. The results of one season's grazing have shown a reduction of leaves and terminal buds on the controls with little or no change in the amount of total live stem. Information such as main stems, laterals, total live stem, bush height, etc., are being recorded for this series of studies as was explained for the five exclosures established prior to grazing on recently logged area. Interest in this study centers primarily on rapidity of growth of stunted ribes and injured pine in comparison with associated vegetation and also on the effects of constant grazing on the controls.

The effects of controlled grazing on the germination, growth and development of ribes and western white pine.

This study is being carried on in cooperation with the University of Idaho and Potlatch Forests, Inc. Its purpose is to determine the effects of known intensities of grazing on proper range utilization. Once this question is answered it will be possible to recommend grazing practices for the western white pine cutover type which will not deplete the range or seriously affect the development of young forest reproduction. The experimental procedure in this study differs from the exclosure type by taking certain numbers of sheep and placing them within an inclosure for a definite grazing period. In this study the Bureau is recording ribes data and cooperating to the fullest extent whenever possible, otherwise all other infor-

mation is being obtained by student labor in the summer employ of Potlatch Forests, Incorporated.

The area selected for study by the personnel of Potlatch Forests is located on the Deer Creek drainage in the Clearwater Forest. Three areas were fenced adjacent to each other for observation. The two outside areas are the inclosures on which grazing will be permitted. The inside area is the control or check which excludes all grazing. Each of the inclosures has an area of 2-1/2 acres which is divided about equally into north and south exposures. These areas were fenced during the early part of the 1939 summer season. The timber previously on this area was cut in 1936 and the slash piled and burned that fall. A light residual stand is composed of pole size white pine and a few merchantable 16-inch plus trees of white fir, spruce, cedar, and some larch. The area was sheeped lightly during the summers of 1937 and 1938. The first ribes information was taken August 3, just prior to the 1939 grazing in the inclosures. This was followed by a check after grazing, which was obtained on August 22 of the same year. The 1940 check before grazing was made the latter part of July and the check after grazing was obtained on the 23rd of August. The sheep were placed in the inclosures on the third and fourth days of August. A total of 50 head of sheep have been placed each season in the separate inclosures. The sheep were held within inclosure A for three days, and within inclosure C for two days. The results of two years' grazing within the inclosures and deferred grazing of the control are shown in table 5.

TABLE NO. 5

THE RESULTS OF CONTROLLED GRAZING ON THE DEVELOPMENT OF RIBES

Plot No.	Date Checked	Total Number Ribes	Feet of Ribes Live Stem		Average Height	Leaves	
			Total	Per Bush	Per Bu. in Ft.	Total	Bush
Inclosure A (Grazed)	8/3/39	11	24.85	2.3	.92	333	30
	8/22/39	13	28.38	2.2	.77	240	19
	7/24/40	16	49.57	3.1	.93	522	33
	8/23/40	15	44.16	2.9	.90	78	5
Control B (Not grazed)	8/3/39	6	24.50	4.1	1.03	268	45
	7/24/40	12	40.04	3.3	1.06	479	40
Inclosure C (Grazed)	8/3/39	13	28.50	2.2	.95	305	24
	8/22/39	14	27.54	2.0	.83	229	16
	7/24/40	14	50.49	3.6	1.16	395	28
	8/23/40	14	50.23	3.6	1.15	279	20

The results of known intensities of grazing on ribes to date have shown a greater reduction of leaves on the area sheeped for three continuous days. Changes in the total number of ribes on the areas can be attributed to a more careful check during the 1940 season. All increases in total ribes shown in table 5 must be considered as established bushes which were found for the first time by the 1940 check. This study was not turned over

to the methods project until 1940. The results of the 1939 check were found to be all in order except that not all ribes on the areas had been located. The results of the 1940 check after grazing within inclosure A shows a reduction of one ribes bush. This ribes was a small bush badly stunted by the 1937 and 1938 grazing which may have been removed or possibly nipped nearly to ground level this past season. It will not be reported, however, as removed by sheep until the 1941 check since it may have been missed or will resprout from the root crown. Observations must be made on these areas a number of seasons before any definite conclusions can be reached upon the effects of different grazing intensities on the development of ribes and western white pine.

The growth and regeneration of upland ribes following the eradication of the more troublesome types in the western white pine region.

During the 1939 field season, seven one-acre plots were established for the purpose of studying the regeneration of upland ribes following the initial and each succeeding eradication disturbance. These plots have been established on the more troublesome eradication types such as cutover, open reproduction, and brush where new ribes seedlings would be most likely to appear following each eradication. A number of observations of these types made by the methods project reveals that so often in the past the physiologically dwarfed ribes have been mistaken for new seedlings and that consequently, ribes regeneration is not at all serious in this region except succeeding a logging disturbance. The seven plots initiated in 1939 to study this question are located on the St. Joe, Coeur d'Alene, Mount Spokane, and Kaniksu blister rust operations. In 1940, two additional regeneration plots were established in cutover and open reproduction types on the Clearwater Forest. This now provides one or more plots of this series on each of the operations in the states of Idaho and Washington.

After the plots had been located and properly marked, a complete check was made of all ribes before the initial eradication. Each ribes was recorded by live stem class, keeping the species segregated. A total of eight live stem classes were made which are shown in table 6. By taking these data before the initial eradication, the original number of ribes and feet of live stem can be used as the basis for determining the extent of disturbance and the resultant germination of ribes seedlings.

Table 6 shows the results of such a check on three different eradication types which are located within the same drainage. New seedlings for R. viscosissimum in open reproduction have been found to increase from one in 1939 to seven in 1940. The cutover type had originally the larger number of ribes seedlings present which came in succeeding the 1937 logging disturbance. The eradication crews were able to reduce the number of seedlings by 12 on the initial eradication. For all types represented, the eradication crews reduced the original ribes population on open reproduction by 78 per cent, brush 71 per cent, and cutover 65 per cent in the removal of R. viscosissimum. The reduction in the amount of live stem has been exceedingly high for all types. The initial eradication reduced the original R. lacustre

population on the open reproduction type by 64 per cent, brush 59 per cent, and cutover 48 per cent. The lower reduction of total ribes usually has been found to accompany the type having the larger number of ribes in the smaller size live stem classes.

TABLE NO. 6

THE RESULTS OF NEW RIBES REGENERATION SUCCEEDING BY ONE YEAR THE INITIAL ERADICATION DISTURBANCE ON THREE MAJOR FOREST TYPES

Type	Year Check	Seed-lings	Number of Bushes Grouped by Feet of Live Stem Classes							Total No. Bu.	F.L.S.
			0-1	1.1-5.0	5.1-10.0	10.1-25.0	25.1-50.0	50.1-100.0	100.1+		
R. viscosissimum											
Open Reproduction	1939	1	135	593	383	438	303	189	70	2,117	45,595
Cutover	1939	54	78	158	37	32	4	2		365	1,557
Brush	1939		12	80	65	129	150	95	53	584	23,607
Open Reproduction	1940	7	249	178	24	5	4			467	892
Cutover	1940	42	61	21	2	1				127	108
Brush	1940	1	33	72	25	32	8			171	1,310
Total All Types	1939	55	225	831	490	599	457	286	123	3,066	70,759
	1940	50	343	271	51	38	12			765	2,310
R. lacustre											
Open Reproduction	1939		28	47	15	13	3	2		106	667
Cutover	1939	12	55	69	15	7	4	1	1	164	763
Brush	1939		10	54	23	32	13	7	3	142	2,295
Open Reproduction	1940		19	17	2					38	61
Cutover	1940	13	53	13	2					86	69
Brush	1940		15	35	5	3				58	172
Total All Types	1939	12	93	170	51	52	20	10	4	412	3,725
	1940	18	87	65	9	3				182	302
All Species All Types	1939	67	318	1,001	541	651	477	296	127	3,478	74,484
	1940	68	430	336	60	41	12			947	2,612

The three areas illustrated in table 6 were worked during the latter part of September when the efficiency of ribes eradication is considered to be at its lowest. This study will not attempt to measure the efficiency of the eradication work or of the checking work, but will be used to correlate the disturbance caused by the removal of ribes with the regeneration of new seedlings. The interesting point in regard to the information obtained from the seven plots to date is that very few seedlings have been found to appear following the initial eradication. This picture may change, however, within the next year, since oftentimes the germination of ribes seed is delayed for at least two years following a mechanical disturbance. Complete information will be presented in the 1941 annual report after two years have elapsed since the initial eradication. In 1941 it may be possible to determine the number of new seedlings germinating on the different types when based upon both the original ribes population and the number of ribes re-

moved by the first eradication. Much information can also be given on the number of missed bushes and resprouts following the initial work and the development of resprouts in building up live stem.

TOOLS AND DEVICES FOR ASSISTING THE FIELD CREWS IN RIBES ERADICATION

By
John F. Breakey
Assistant Pathologist

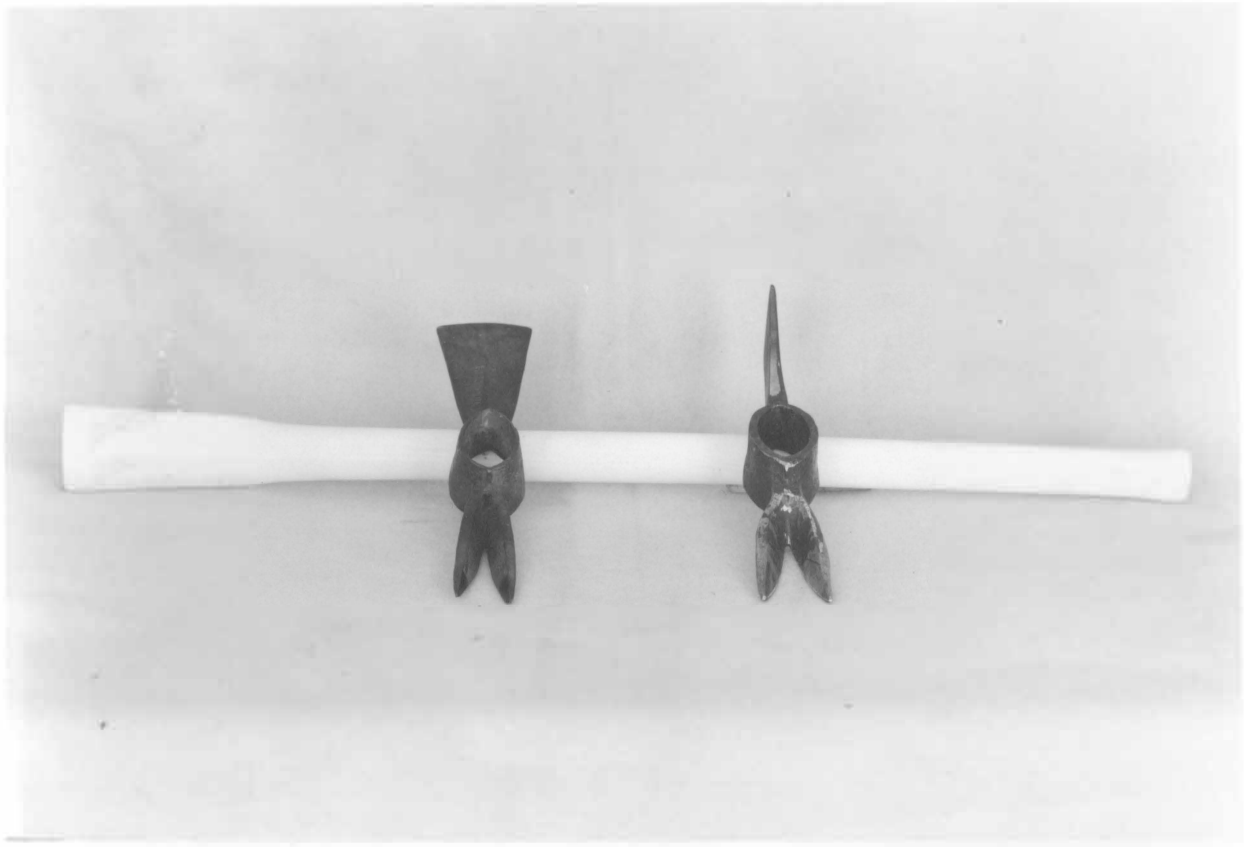
Portable camp units originally built to last three seasons have passed through their fifth summer and are still in fair condition. Worn parts are replaced, collapsible messhall benches have been rebraced and wedged.

Trucks and cars are repaired and reconditioned in shops maintained at Clarkia and Kalispell Bay, Priest Lake, Idaho. Truck racks and cabs are repainted following the replacement of broken or damaged parts. Chassis are rebushed, clutches and brakes are relined and motors tightened and retuned. Motor testing apparatus consisting of a combustion analyzer, a battery starter tester, a compression tester, a vacuum tester, a power timing light and Dwell-Tach tester were put into service. This equipment makes it possible to tune and adjust worn motors back to new car performance. Photo W 2656 shows trucks ready for camp supply service.

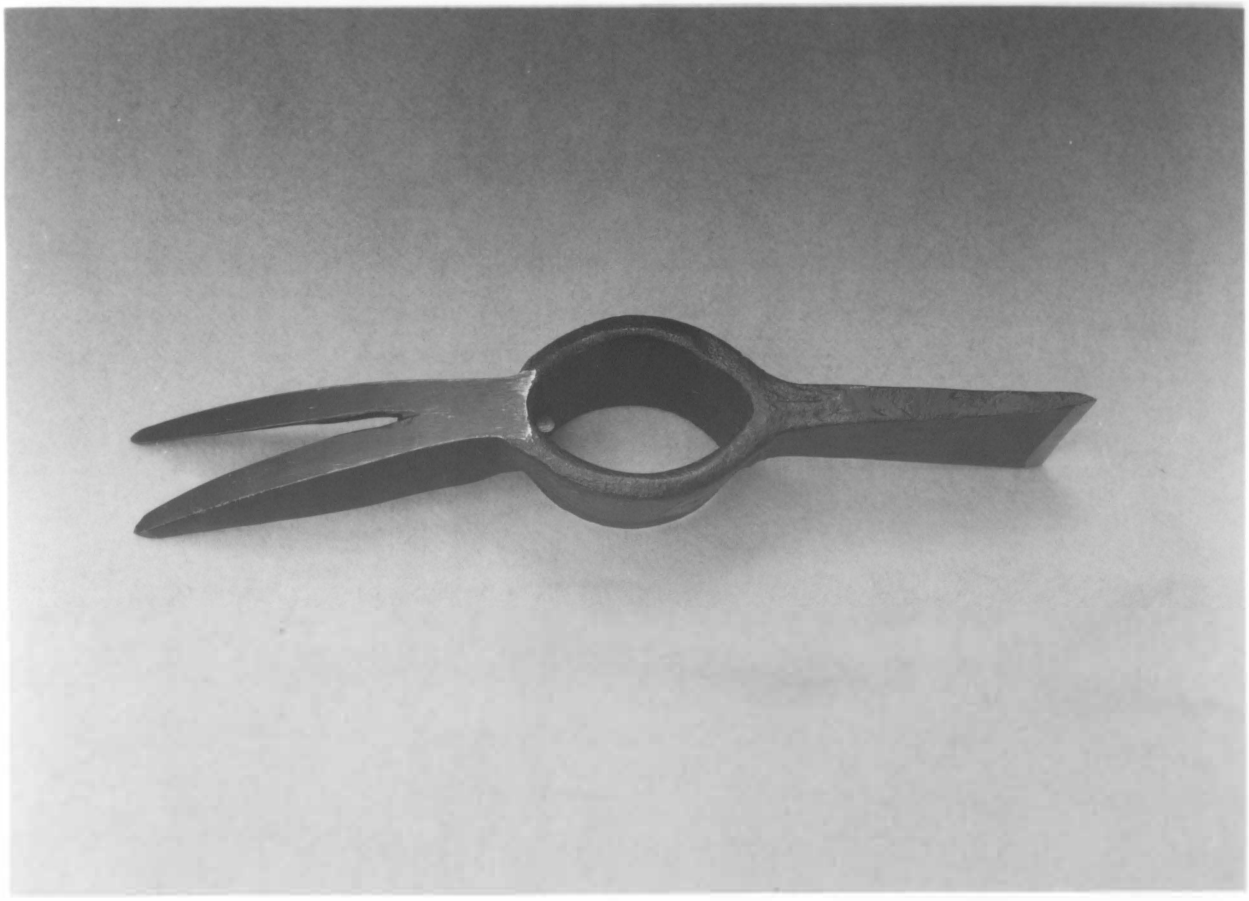
Drawings of the new claw-mattock ribes tool (see W 28 right and W 4) were supplied and supervision of the construction of 2,500 new tools for the U. S. Forest Service was furnished. Number 1077 carbon steel was used to get a strong tool that will not break down. All old ribes tools, approximately 1,200, were reshaped and oil tempered in the blacksmith shop at Clarkia.

In picture W 28 the tool on the right is the latest type of high carbon steel tool with sturdy, wide jaws. The tool on the left is the one used in 1937. Picture W 4 shows the latest model tool in detail.

The 32 inch second growth hickory handle has been accepted as the standard for ribes tools. For all tools placed in general use in the field it has been the practice to get a well shaped handle and hold to one pattern.



W 28. Clow mattock at left used in 1937. Clow mattock at right used in 1940. 32 inch second growth hickory handle in background



W 4 Latest model of ribes tool

W 2656. Blister rust trucks repaired at the Clarkia shop.

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1940

By
Edward L. Joy, Forester
H. Miller Cowling, Chief Scientific Aid

The photographic and educational work of 1940 followed the same general pattern of the work of this project for the past several years. The photographic department, under the supervision of Mr. Cowling, includes reproducing by Multilith and black line printer as well as the strictly photographic phases of still and motion picture taking and laboratory processing. All of these services are provided for both the Northwestern and Sugar Pine Regions. During the past year another Bureau project, Pear Psylla Control, was also serviced by this department on a cooperative basis. The latter involved use of some equipment by competent operators from their personnel for production of their needs, although strictly photographic work was handled by technicians of this office.

Educational activities, which do not have the services of a full time supervisor, were handled by various members of the personnel along with their regular duties. An addition in this field during 1940 was a 900-foot all color motion picture on blister rust and its control. For a short period during the late summer one temporary assistant was used to handle this film for camp and other showings.

Details of the photographic and educational work done in 1940 are given in the following accounts:

A. Photographic Section

The objectives of the photographic department are (1) to maintain a pictorial record of all phases of investigative and control work, (2) to provide the supervisory field personnel with photographs and maps which will facilitate control work, (3) to enlarge or reduce maps and charts to the sizes suitable for reports or field use, and (4) to provide illustrative material for educational purposes.

During 1940 all types of work outlined were continued. Field trips were made to all of the Northwestern Region operations and to the Sugar Pine Region in order to secure up-to-date illustrations of all types of control and investigative work. In the laboratory reproductions were made of charts, tables and maps for the annual report, special reports, and other uses. Enlargements of maps of various sizes to meet the needs of both reports and field uses were made by photographic process. For educational work enlargements for coloring, lantern slides both in black and white and natural color, and motion pictures were prepared.

The Multilith machine continued to be an essential part of the photographic section. This machine prints on either paper or card stock up to 9½x14 inches. Field manuals and forms for field use, subject to changes from time to time according to the developments of the work, made up the volume of work produced by this method. The printing of colored maps with

this machine has proven the best and most economical method of reproducing this type of informational material. The availability of the Multilith has proven to be particularly valuable on occasions when midseason changes in essential forms were necessary.

The black line printing machine came in for considerable use during the first full year of operation. On this machine it is possible to reproduce from cloth tracings all maps and drawings. The result is a reproduction to scale with black lines on white background. Since there is no shrinkage during the processing, exact reproductions can be turned out in any volume to meet the demands for field use. In cases where additional data are to be added to the original tracings and the original tracing is needed for future use, duplicate tracings are made on the machine. The volume of work produced with this machine during the year was doubled due to maps reproduced for the Pear Psylla Control project.

Color photography continued to be the major field work during the 1940 season using both a 16 mm. moving picture camera and a 6.5x9 cm. camera for still pictures required for lantern slides.

The scope of the moving picture field was expanded through the purchase of a micro attachment. This device permits subjects to be photographed one-half size, full size and twice the size of the original when supplemented with the lenses standardly used. The resulting magnification when projected on the screen shows added detail that has not been secured in the past.

Through experiments made during 1939 it was determined that a camera for taking color pictures to actual lantern slide size would be an important addition to the photographic equipment. A 6.5x9 cm. camera which takes pictures up to actual size of image was secured and has proven exceptionally satisfactory.

The amount of photographic, Multilith and black line printer work produced during 1940, including work for the Pear Psylla Control, is shown in the following table:

PHOTOGRAPHIC, MULTILITH AND BLACK LINE WORK

Item		Northwestern Region	Sugar Pine Region	Total
PHOTOGRAPHIC				
Lantern slides,	black & white	16		16
	natural color	138	32	170
Films, developed, field films		116	20	136
Copies	5x7	4		4
	8x10	172	67	239
Printing	4x5 or smaller	110	54	164
	5x7	1,527	315	1,842
	8x10	330	14	344
	9x11	3,007	4,108	7,115
Enlarging	11x14 or smaller	234	407	641
	16x20		124	124
	30x40	107		107
Movie film	50 ft. rolls	4		4
	100 ft. rolls	25	9	34
Total Items		5,790	5,150	10,940
MULTILITH				
Copies		33	20	53
Plates made		32	15	47
Cards printed		21,300		21,300
Cards printed, reverse		20,000		20,000
Total cards		41,300		41,300
Paper printed		103,000	5,500	108,500
Paper printed, reverse		30,500	4,000	34,500
Total paper		133,500	9,500	143,000
Total Items		174,865	9,535	184,400
BLACK LINE PRINTER				
Total maps printed		1,983	54	2,037
Grand total all items		182,638	14,739	197,377

B. Educational Section.

To comply with the demands for information and instruction on blister rust and its control, bulletins, posters, pictures, slides, and talks have been used. To this list was added a motion picture upon its completion in the spring of 1940. Through these features it has been possible to reach a large number of people including blister rust personnel in the Bureau, Forest Service, and State camps, timber owners or administrators, students in both the high schools and colleges, and many of the general public. The following set forth the scope of each of these features:

1. Bulletins, Posters and Specimens

The bulletins issued in 1940 are the same as those used in 1939. Of about 10 used, the Forest Service-Bureau publication "The War on White Pine Blister Rust in the Inland Empire" and Miscellaneous Publication No. 23, "Protect Western White Pine and Sugar Pine from Blister Rust", are of greatest value. During the year all bulletins issued from Spokane totaled about 1,500.

Use of the new poster, designed for the western regions, was confined mainly to blister rust control and CCC camps and the headquarters of various forest activities. Several of these along with the bulletins were used for a Camp Fire Girl Guardians' School camp. The total of posters issued during the year was about 150.

Preserved specimens in display cases and bulk specimens for classroom use were again distributed. Most notable of this material issued were 13 jars of leaves and cankers and 30 tubes of cankers sent to the University of California, and 7 jars of leaves and cankers supplied to the University of Idaho.

2. Talks, Slides and Motion Pictures

Talks, both with and without lantern slides, have been a major feature of the educational program during past years and to a limited extent were used in 1940. With the completion of a silent motion picture, though, this medium replaced the other form of presentation to a great extent. It is notable too that because this form of "talk" is more desired by the general public, more opportunities are offered for engagements. This proved to be the case for both the Bureau and Forest Service, the latter also using a copy of the film.

With the film available for use only during the last seven months of the year, many of the schools and other organizations could not be served with showings until after the field season and some not until 1941. In spite of this the season's total was 61 projections to 3,686 people for the Bureau copy of the film. No report is available on the use of the Forest Service copy, but it is known that the film was used extensively.

3. Fairs and Exhibits

This medium for education and information was not used directly by the Bureau during 1940. However, some of the material for a blister rust exhibit by the Forest Service at the Bonner County Fair in Sandpoint, Idaho, was provided.

4. General Publicity

Various news items on blister rust and the control work appeared in papers of the region during 1940. Although purely informational, many of these referred to the allotments for the work and the extent of employment involved. The latter pertains particularly to the WPA projects since this work is especially suitable for relief assignment.

APPENDIX

TABLE NO. 1

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
CALENDAR YEAR 1940, REGULAR APPROPRIATIONS

Project	January 1 to June 30, 1940			July 1 to December 31, 1940			Grand Total
	Salaries	Expense	Total	Salaries	Expense	Total	
3.2 Cooperative Ribes Eradication on Federal Lands							
3.21-2 - Cabinet National Forest, Montana	$ 675.00	$ 40.35	$ 715.35	$ 675.00	$ 51.11	$ 726.11	$ 1,441.46
3.21-3 - Kootenai National Forest, Montana	675.00	40.35	715.35	675.00	51.13	726.13	1,441.48
3.22 - Method Studies of Ribes Eradication, Idaho	1,450.16	4.24	1,454.40	1,299.96		1,299.96	2,754.36
3.3 Cooperative Ribes Eradication on National Parks							
3.31 - Glacier National Park, Montana	139.20	17.12	156.32	550.00	102.05	652.05	808.37
3.33-1 - Mt. Rainier National Park, Washington		89.09	89.09	550.00	1.60	551.60	640.69
3.4 Cooperative Ribes Eradication on State and Private Lands							
3.42-1 - Clearwater Operation, Idaho	3,623.86	162.09	3,785.95	3,000.00		3,000.00	6,785.95
3.42-2 - St. Joe Operation, Idaho	4,932.30		4,932.30	4,487.70		4,487.70	9,420.00
3.42-3 - Coeur d'Alene Operation, Idaho	1,350.00		1,350.00	1,350.00		1,350.00	2,700.00
3.42-4 - Kaniksu Operation, Idaho	3,000.00		3,000.00	1,900.00		1,900.00	4,900.00
3.42-5 - Mt. Spokane Operation, Idaho	825.00		825.00	550.00		550.00	1,375.00
3.43-2 - Mt. Spokane Operation, Washington	877.00		877.00				877.00
4.1 Field Studies, Spread of the Rust							
4.12 - Idaho	3,007.30		3,007.30	3,249.96		3,249.96	6,257.26
4.13 - Washington	25.20	10.00	35.20		10.00	10.00	45.20
4.16 - Wyoming					176.77	176.77	176.77
6. Educational Work	1,345.83	62.50	1,408.33	1,350.00	51.09	1,401.09	2,809.42
9. Maintenance of Field Office and Miscellaneous Expenses							
9.1 - Supervision	2,400.00	311.65	2,711.65	2,400.00	74.71	2,474.71	5,186.36
9.2 - Office Maintenance	9,218.11	18.18	9,236.29	10,579.80	19.60	10,599.40	19,835.69
9.4 - Miscellaneous Purchases Made in Washington, D.C.		2,124.49	2,124.49				2,124.49
Grand Total	$33,543.96	$2,880.06	$36,424.02	$32,617.42	$538.06	$33,155.48	$69,579.50

TABLE NO. 2

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JANUARY 1 - JUNE 30, 1940
201087-650999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
FEDERAL NON-CONSTRUCTION PROJECTS (TRANSFER FROM W.P.A.) 1940

Project	Salaries	Expense	Total
01-2-92-91, Idaho			
8.12 Field Studies, Pine Disease Survey	$ 948.26	$ 190.30	$ 1,138.56
8.22 Method Studies of Ribes Eradication		106.28	106.28
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	19,369.56	11,937.42	31,306.98
8.42-2 Cooperative Ribes Eradication, St. Joe Operation	20,885.90	13,262.06	34,147.96
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation		57.66	57.66
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation	14,811.23	4,729.07	19,540.30
8.42-5 Cooperative Ribes Eradication, Mt. Spokane Operation	5,842.60	2,374.44	8,217.04
8.6 Educational Work		1,384.14	1,384.14
8.9-1 Supervision		57.41	57.41
8.9-2 Spokane Office Maintenance		1,285.31	1,285.31
8.9-3 Miscellaneous Supplies and Services		1,124.69	1,124.69
Total 01-2-92-91 Idaho	61,857.55	36,508.78	98,366.33
01-2-93-102 Washington			
8.13 Field Studies, Pine Disease Survey	2,015.54		2,015.54
8.33-1 Cooperative Ribes Eradication, Mt. Rainier National Park		20.95	20.95
8.43-1 Cooperative Ribes Eradication, Kaniksu Operation	176.69		176.69
8.43-2 Cooperative Ribes Eradication, Mt. Spokane Operation	4,795.38	858.27	5,653.65
8.6 Educational Work	1,031.55	393.30	1,424.85
8.9-1 Supervision		4.64	4.64
8.9-2 Spokane Office Maintenance	4,628.42	215.51	4,843.93
8.9-3 Miscellaneous Supplies and Services	1,140.53	505.29	1,645.82
Total 01-2-93-102 Washington	13,788.11	1,997.96	15,786.07
Grand Total January 1 - June 30, 1940	$75,645.66	$38,506.74	$114,152.40

201088-650999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
ADMINISTRATIVE EXPENSES (TRANSFER FROM W.P.A.) 1940

01-9-08-1 Washington			
8.6 Educational Work		9.97	9.97
8.9-2 Spokane Office Maintenance	2,425.69	1,157.61	3,583.30
8.9-3 Miscellaneous Supplies and Services		414.26	414.26
Total Administrative, 201088	$ 2,425.69	$ 1,581.84	$ 4,007.53

TABLE NO. 3

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JULY 1 - DECEMBER 31, 1940
401087-651999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
FEDERAL NON-CONSTRUCTION PROJECTS (TRANSFER FROM W.P.A.) 1941

Project	Salaries	Expense	Total
101-2-92-7, Idaho			
8.12 Field Studies, Pine Disease Survey	$ 451.87	$ 284.08	$ 735.95
8.22 Method Studies of Ribes Eradication		119.54	119.54
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	27,266.17	4,285.67	31,551.84
8.42-2 Cooperative Ribes Eradication, St. Joe Operation	30,062.00	6,323.44	36,385.44
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation		135.10	135.10
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation	39,965.20	2,957.85	42,923.05
8.42-5 Cooperative Ribes Eradication, Mt. Spokane Operation	14,179.13	2,147.44	16,326.57
8.6 Educational Work		156.84	156.84
8.9-1 Supervision		146.11	146.11
8.9-2 Spokane Office Maintenance	607.00	1,445.65	2,052.65
8.9-3 Miscellaneous Supplies and Services		199.40	199.40
Total 101-2-92-7, Idaho	112,531.37	18,201.12	130,732.49
101-2-93-17, Washington			
8.13 Field Studies, Pine Disease Survey	1,327.63	7.00	1,334.63
8.33-1 Cooperative Ribes Eradication, Mt. Rainier National Park		157.74	157.74
8.43-2 Cooperative Ribes Eradication, Mt. Spokane Operation	7,512.23	672.41	8,184.64
8.6 Educational Work	595.03		595.03
8.9-2 Spokane Office Maintenance	3,170.88	912.30	4,083.18
8.9-3 Miscellaneous Supplies and Services	1,039.48	471.86	1,511.34
Total 101-2-93-17, Washington	13,645.25	2,221.31	15,866.56
Grand Total July 1 - December 31, 1940	$126,176.62	$20,422.43	$146,599.05

401008-651999 EMERGENCY RELIEF, AGRICULTURE,
ADMINISTRATIVE EXPENSES (TRANSFER FROM W.P.A.) 1941

101-9-00-1, Washington			
8.9-2 Spokane Office Maintenance	1,531.04		1,531.04
8.9-3 Miscellaneous Supplies and Services		23.28	23.28
Total Administrative, 401008	$ 1,531.04	$ 23.28	$ 1,554.32

TABLE NO. 4

*SUPPLEMENTAL REPORT OF FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JULY 1, 1936 - JUNE 30, 1937
201085, EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE, FLOOD CONTROL AND OTHER CONSERVATION, 1936 - 1937

Project	Adjustments and Additions to 1936 and 1937 Annual Report Tables*		
	July 1, 1936 - December 31, 1936		January 1, 1937 - June 30, 1937
	Salary	Expense	Expense
201-5010, Idaho			
8.12 Field Studies, Pine Disease Survey			$ 1.61
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	$ 5.13		254.36
8.42-2 Cooperative Ribes Eradication, St. Joe Operation			254.43
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation			28.54
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation			148.48
8.9-3 Miscellaneous Supplies and Services			46.01
Total 201-5010, Idaho	5.13		733.43
201-5010, Washington			
8.9-3 Miscellaneous Supplies and Services		$2.51	
Total 201-5010, Washington		2.51	
201-5010, Wyoming			
8.46 Cooperative Ribes Eradication, Medicine Bow Operation	(-108.33)**		8.54
Total 201-5010, Wyoming	(-108.33)		8.54
Grand Total July 1, 1936 - June 30, 1937	$(-103.20)	$2.51	$741.97

*SUPPLEMENTAL REPORT FOR JULY 1, 1937 - JUNE 30, 1938
501082, EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
PUBLIC BUILDINGS, PARKS, UTILITIES, FLOOD CONTROL, ETC., 1938

	January 1, 1938 - June 30, 1938
	Expense
501-2-108, Idaho	
8.9-3 Miscellaneous Supplies and Services	$1.76
Total 501-2-108, Idaho	1.76
Grand Total July 1, 1937 - June 30, 1938	$1.76

* These supplemental items cover vouchers paid at irregular intervals subsequent to annual reports submitted for these periods. Expenses consist entirely of Government bill of lading freight charges on equipment and supplies.

** To adjust salary over reported on 1936 report.

TABLE NO. 5

SUMMARY OF EXPENDITURES FROM STATE AND PRIVATE FUNDS
1928 - 1940 IDAHO

Year	State	Private	Total
1928	$ 2,518.55	$ 2,264.32	$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
Total	$132,148.50	$88,383.63	$220,532.13

TABLE NO. 6

SUMMARY OF FEDERAL EXPENDITURES BY ACTIVITIES, NORTHWESTERN REGION
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
1940

State	Appropriation	Total Expenditures	Activity						
			Ribes Eradication	Methods Development	Pre-Eradication	Disease Survey	Education and Information	Office and Miscellaneous	Supervision
Idaho	Regular	$ 53,778.54	$ 20,005.76	$2,754.36	$405.00	$ 6,257.26	$1,809.42	$18,260.18	$4,286.36
	ERA	233,982.82	217,768.63	225.82		1,874.51	1,540.98	12,572.88	
	Total	287,761.16	237,774.39	2,980.18	405.00	8,131.77	3,350.40	30,833.06	4,286.36
Montana	Regular	6,239.39	3,739.39				500.00	1,700.00	300.00
Washington	Regular	8,885.00	5,739.80			45.20	500.00	2,000.00	600.00
	ERA	32,330.48	13,835.37			3,350.17	2,029.85	13,115.09	
	Total	41,215.48	19,575.17			3,395.37	2,529.85	15,115.09	600.00
Subtotal Western White Pine Region	Regular	68,902.73	29,484.95	2,754.36	405.00	6,302.46	2,809.42	21,960.18	5,186.36
	ERA	266,313.30	231,604.00	225.82		5,224.68	3,570.83	25,687.97	
	Total	335,216.03	261,088.95	2,980.18	405.00	11,527.14	6,380.25	47,648.15	5,186.36
Wyoming	Regular	676.77				676.77			
	ERA								
	Total	676.77				676.77			
Total Northwestern Region	Regular	69,579.50	29,484.95	2,754.36	405.00	6,979.23	2,809.42	21,960.18	5,186.36
	ERA	266,313.30	231,604.00	225.82		5,224.68	3,570.83	25,687.97	
	Total	$335,892.80	$261,088.95	$2,980.18	$405.00	$12,203.91	$6,380.24	$47,648.15	$5,186.36

TABLE NO. 7

SUMMARY OF FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
1922 - 1940

State	Appropriation	Total	Ribes Eradication	Methods Development	Chemical Investigation	Reconnaissance and Preeradication	Ecology	Disease Survey and Scouting	Damage Studies	Education and Information	Quarantine Enforcement	Cultivated Black Currant Eradication	Nursery Sanitation	Office and Miscellaneous	Supervision
Idaho	Regular	$1,165,160.60	$ 607,230.11	$ 95,424.30	$ 64,575.98	$54,438.32	$45,103.42	$ 29,986.64	$25,679.88	$33,824.52	$10,758.86	$ 28,173.15		$132,010.71	$37,954.71
	NIRA	470,841.62	423,058.33	4,662.40	3,441.74		3,293.09			6,366.50				28,083.54	1,935.92
	ERA	2,900,763.68	2,791,029.15	2,183.38	937.99			33,569.03		4,635.80	1,456.86			65,432.28	1,519.19
	Total	4,536,765.90	3,821,317.59	102,270.08	68,955.71	54,438.32	48,396.51	63,555.67	25,679.88	44,826.82	12,215.72	28,173.15		225,526.53	41,409.82
Montana	Regular	191,953.09	28,906.59	11,949.39	15,809.93	12,400.17	2,533.00	13,928.33	7,517.94	10,263.40	9,781.81	22,010.30	$15,160.41	31,038.42	10,553.30
	NIRA	88,306.79	80,458.56		258.00	902.74				2,689.14			148.36	3,287.99	562.00
	ERA	196,847.11	193,848.78					219.31		32.72				2,730.30	16.00
	Total	477,106.99	303,214.03	11,949.39	16,067.93	13,302.91	2,533.00	14,147.64	7,517.94	12,985.26	9,781.81	22,010.30	15,308.77	37,056.71	11,231.30
Washington	Regular	211,869.75	21,712.62	815.00	12,837.91	4,770.40	2,425.10	21,033.39	8,150.83	7,023.13	13,957.24	63,838.81	2,273.74	32,154.05	15,877.53
	NIRA	105,199.60	92,044.82		274.01					3,170.46				9,148.31	562.00
	ERA	437,039.29	267,672.77	79.06	41.74	307.37		8,609.73		13,987.97				146,193.50	148.15
	Total	754,108.64	381,430.21	893.06	13,153.66	5,077.77	2,425.10	29,643.12	8,150.83	24,181.56	13,957.24	63,838.81	2,273.74	187,495.86	16,587.68
Total Western White Pine Region	Regular	1,568,983.44	657,849.42	108,188.69	93,223.82	71,608.89	50,061.52	64,948.36	41,348.65	51,111.05	39,497.91	114,022.26	17,434.15	195,203.18	64,485.54
	NIRA	664,348.01	595,561.71	4,662.40	3,973.75	902.74	3,293.09			12,226.10			148.36	40,519.84	3,059.92
	ERA	3,534,650.08	3,252,550.70	2,261.44	979.73	307.37		42,398.07		18,656.49	1,456.86			214,356.08	1,683.34
	Total	5,767,981.53	4,505,961.83	115,112.53	98,177.30	72,819.00	53,354.61	107,346.43	41,348.65	81,993.64	40,954.77	114,022.26	17,582.51	450,079.20	69,228.80
Colorado	Regular	11,852.04	5,509.48		700.00			611.65		1,226.64	136.68			2,606.40	1,061.19
	NIRA	8,041.45		823.28	52.00	6,422.74				100.00				520.43	123.00
	ERA	59,396.51	54,444.49		124.11	15.11				511.99				4,175.81	125.00
	Total	79,290.00	59,953.97	823.28	876.11	6,437.85		611.65		1,838.63	136.68			7,302.64	1,309.19
Wyoming	Regular	10,480.59	4,318.27		700.00	598.64		890.88		359.84	47.85			2,567.14	997.97
	NIRA	7,107.41			191.42	5,641.49				100.00				1,051.50	123.00
	ERA	58,283.96	54,151.34			30.60				193.22				3,734.87	173.93
	Total	75,871.96	58,469.61		891.42	6,270.73		890.88		653.06	47.85			7,353.51	1,294.90
Total Central Rocky Mountain Region	Regular	22,332.63	9,827.75		1,400.00	598.64		1,502.53		1,586.48	184.53			5,173.54	2,059.16
	NIRA	15,148.86		823.28	243.42	12,064.23				200.00				1,571.93	246.00
	ERA	117,680.47	108,595.83		124.11	45.71				705.21				7,910.68	298.93
	Total	155,161.96	118,423.58	823.28	1,767.53	12,708.58		1,502.53		2,491.69	134.53			14,656.15	2,604.09
Total Northwestern Region	Regular	1,591,316.07	667,677.17	108,188.69	94,623.82	72,207.53	50,061.52	66,450.89	41,348.65	52,697.53	39,682.44	114,022.26	17,434.15	200,376.72	66,544.70
	NIRA	679,496.87	595,561.71	5,485.68	4,217.17	12,966.97	3,293.09			12,426.10			148.36	42,091.87	3,305.92
	ERA	3,652,330.55	3,361,146.53	2,261.44	1,103.84	353.08		42,398.07		19,361.70	1,456.86			222,266.76	1,982.27
	Total	$5,923,143.49	$4,624,385.41	$115,935.81	$99,944.83	$85,527.58	$53,354.61	$108,848.96	$41,348.65	$84,485.33	$41,139.30	$114,022.26	$17,582.51	$464,735.35	$71,832.89

TABLE NO. 1

SUMMARY OF 1940 RIBES ERADICATION

State	Initial Eradication Work				Reeradication Work				Totals				Per Cent Initial Eradication Worked**
	Acreage Worked	Number Ribes Destroyed		Number* 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	
		Wild	Cultivated			Wild	Cultivated			Wild	Cultivated		
Idaho	19,138	4,870,959	-	27,876	71,855	10,104,906	-	92,085	90,993	14,975,865	-	119,961	0.9
Montana	11,002	978,915	-	9,803	2,155	159,186	-	2,181	13,157	1,138,101	-	11,984	5.6
Washington	6,468	2,593,261	-	5,703	6,980	1,126,912	-	6,501	13,448	3,720,173	-	12,204	3.8
Total	36,608	8,443,135	-	43,382	80,990	11,391,004	-	100,767	117,598	19,834,139	-	144,149	1.5 #

* Number 8-hour man days = hours worked per day x number men / 8

** Percentage of total white pine control acreage in state that was worked during 1940.

1.5 is based on control area for Inland Empire put on basis of all states (Wyoming and Colorado) the percentage figure would be 1.2.

State	Ribes Per Acre		Man Days Per Acre		Number of Camps				Number of Employees*					
	Initial Eradication	Reeradication	Initial Eradication	Reeradication	C.C.C.	W.P.A.	Regular	Total	Laborers C.C.C.	Laborers W.P.A.	Laborers Regular	Laborers Total	All Supervision	Total Employees
Idaho	255	141	1.46	1.28	14	15	28	57	1,133	1,066	927	3,126	205	3,331
Montana	89	74	.89	1.01	5	4	3	12	198	185	85	468	29	497
Washington	401	161	.88	.93	4	1	3	8	164	58	99	321	22	343
Total	231	141	1.19	1.24	23	20	34	77	1,495	1,309	1,111	3,915	256	4,171

* Maximum number of persons on the pay roll at the peak of the season. Total number persons employed is not used because the large turnover in W.P.A. camps would result in an exaggerated figure.

TABLE NO. 1A

SUMMARY OF ALL RIBES ERADICATION 1918-1940 (INCLUSIVE)

State a	Total Acreage White Pine b	Acreage White Pine Worth Protection c	Acreage Control Areas (White Pine and Protective Zones) d	Acreage Reported Initially Worked e	Initial Eradication Work			
					Net Acreage Worked in Control Areas f	Number Ribes Destroyed		Number 8-Hour Man Days i
						Wild g	Cultivated h	
Colorado	550,000*	206,000*	206,000*	14,859	14,859	410,649	-	6,292
Idaho	2,307,655	2,307,655	2,153,741	1,620,859	1,620,859	316,533,141	-	1,294,288
Montana	220,740	220,740	194,544	123,281	123,281	16,011,047	-	85,404
Washington	169,349	169,349	169,349	119,162	119,162	27,276,872	-	101,176
Wyoming	3,754,000*	304,000*	247,900*	21,760	21,760	1,085,771	-	6,940
Total	7,001,744	3,207,744	2,971,534	1,899,921	1,899,921	361,317,480	-	1,494,100

*Incomplete

State a	Reeradication				Totals				Percent Initial Eradication Worked*	Per Acre			
	Acreage Worked b	Number Ribes Destroyed		Number 8-Hour Man Days e	Net Acreage Worked in Control Areas f	Number Ribes Destroyed		Number 8-Hour Man Days i		Ribes		Man Days	
		Wild c	Cultivated d			Wild g	Cultivated h			Initial Eradication	Re-eradication	Initial Eradication	Re-eradication
Colorado	1,962	86,886	-	664	16,821	497,535	-	6,956	7.2	28	44	.42	.34
Idaho	319,263	49,574,968	-	345,632	1,940,122	366,108,109	-	1,639,920	75.3	195	155	.80	1.08
Montana	8,113	1,114,881	-	10,270	131,394	17,125,928	-	95,674	63.4	130	137	.69	1.26
Washington	29,233	4,751,004	-	28,429	148,395	32,027,876	-	129,605	70.4	229	162	.85	.97
Wyoming	-	-	-	-	21,760	1,085,771	-	6,940	8.8	50	-	.31	-
Total	358,571	55,527,739	-	384,995	2,258,492	416,845,219	-	1,879,095	63.9	190	155	.79	1.07

*Percentage of total white pine control area in State that has been worked initially.

TABLE NO. 2

SUMMARY OF 1940 RIBES ERADICATION BY PROGRAMS
(Including All Work - Initial and Reeradication)

State	Total Acreage Worked (Initial and Reeradication)	Regular and Cooperative				W.P.A. and E.R.A.			
		Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days
			Wild	Cultivated			Wild	Cultivated	
Idaho	90,993	42,470	6,386,998	-	47,159	34,995	6,811,647	-	43,808
Montana	13,157	4,516	428,573	-	4,224	5,000	482,417	-	5,006
Washington	13,448	9,170	3,193,411	-	6,910	3,022	357,666	-	2,733
Total	117,598	56,156	10,008,982	-	58,293	43,017	7,651,730	-	51,547

State	E.C.W. and S.C.S.				Totals			
	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days
		Wild	Cultivated			Wild	Cultivated	
Idaho	13,528	1,777,220	-	28,994	90,993	14,975,865	-	119,961
Montana	3,641	227,111	-	2,754	13,157	1,138,101	-	11,984
Washington	1,256	169,096	-	2,561	13,448	3,720,173	-	12,204
Total	18,425	2,173,427	-	34,309	117,598	19,834,139	-	144,149

TABLE NO. 2A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1940 (INCLUSIVE)
(Initial and Reeradication)

State	Total* Acreage Reported Worked (Initial and Reeradication)	Regular and Cooperative				W.P.A and E.R.A.			
		Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days
			Wild	Cultivated			Wild	Cultivated	
Colorado	16,821	-	-	-	-	16,821	497,535	-	6,956
Idaho	1,940,122	505,098	89,982,920	-	371,487	495,319	90,629,477	-	404,791
Montana	131,394	13,530	2,436,552	-	16,164	57,243	6,208,989	-	41,067
Washington	148,395	15,108	5,608,209	-	16,196	38,891	13,462,963	-	51,997
Wyoming	21,760	-	-	-	-	21,760	1,085,771	-	6,940
Total	2,258,492	533,736	98,027,681	-	403,847	630,034	111,884,735	-	511,751

*This column = column e, Table 1A, Sheet 1, plus column and Table 1A Sheet 2.

State	E.C.W. and S.C.S.				P.W.A. or N.R.A.				Total Emergency Program (W.P.A.-E.C.W.-P.W.A.)			
	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days
		Wild	Cultivated			Wild	Cultivated			Wild	Cultivated	
Colorado	-	-	-	-	-	-	-	-	16,821	497,535	-	6,956
Idaho	587,864	123,253,440	-	655,192	351,841	62,242,272	-	208,450	1,435,024	276,125,189	-	1,268,433
Montana	16,633	1,638,078	-	13,627	43,988	6,842,309	-	24,816	117,864	14,689,376	-	79,510
Washington	33,246	4,749,950	-	36,993	61,150	8,206,754	-	24,419	133,287	26,419,667	-	113,409
Wyoming	-	-	-	-	-	-	-	-	21,760	1,085,771	-	6,940
Total	637,743	129,641,468	-	705,812	456,979	77,291,335	-	257,685	1,724,756	318,817,538	-	1,475,248

TABLE NO. 3

SUMMARY OF ALL OTHER CONTROL WORK FOR 1940

State	Cultivated Black Currant Eradication				Nursery Sanitation						Preeradication Survey	
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man Days	Number Nurseries Worked	Number White Pines in Nurseries	Number Acres Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Number Acres Mapped White Pine and Protection Zones	Number 8-Hour Man Days
								Wild	Cultivated			
Idaho	-	-	-	-	-	-	-	-	-	-	17,530	270
Montana	-	-	-	-	1	15,000,000	171	6,108	-	87	-	-
Total	-	-	-	-	1	15,000,000	171	6,108	-	87	17,530	270

State	Treatment Infected Trees					Checking					
						Advance		Post		Regular	
	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days
Idaho	40,196	23,919	8,484	-	254	-	-	-	-	-	-
Montana	8,466	8,150	316	-	195	-	-	-	-	-	-
Total	48,662	32,069	8,800	-	449	-	-	-	-	-	-

TABLE NO. 3A

SUMMARY OF ALL OTHER CONTROL WORK 1918-1940 (INCLUSIVE)

State	Cultivated Black Currant Eradication				Nursery Sanitation							
					Number of Nurseries		Number Acres Worked			Number Ribes Destroyed		
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man Days	Sanitation Zone Maintained	Sanitation Zone Abandoned	Nurseries Maintaining Zones	Nurseries Which Abandoned Zones	Total Acreage	Wild	Cultivated	Number 8-Hour Man Days
Colorado	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	5,233	2,471	16,553	2,341	-	-	-	-	-	-	-	-
Montana	1,311	798	5,080	514	1	-	8,357	-	8,357	1,336,981	-	6,753
Washington	50,050	5,378	78,226	4,218	1	-	378	-	378	20,275	-	640
Wyoming	-	-	-	-	1	-	2,038	-	2,038	73,786	-	567
Total	56,594	8,647	99,859	7,073	3	-	10,773	-	10,773	1,431,042	-	7,960

State	Preeradication Survey		Treatment Infected White Pine				
	Number Acres Mapped White Pine and Protection Zones	Number 8-Hour Man Days	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days
Colorado	206,000	290	-	-	-	-	-
Idaho	3,269,860	4,125	40,196	23,919	8,484	-	254
Montana	259,675	798	8,466	8,150	316	-	195
Washington	146,541	342	-	-	-	-	-
Wyoming	317,900	329	-	-	-	-	-
Total	4,199,976	5,884	48,662	32,069	8,800	-	449

TABLE NO. 4

SUMMARY OF EXPENDITURES FOR 1940

State	Total			Recapitulation of Federal Funds						
				Regular Funds			Emergency Funds			
	Federal (All Agencies Including "State W.P.A. projects")	State (Including All Cooperative Funds)	Grand Total	Bureau of Entomology and Plant Quarantine	Forest Service	Department of Interior*	Federal W.P.A. and N.Y.A.	State W.P.A.	E.C.W. and S.C.S.	Total Emergency Funds
Idaho	$717,084.77	$10,034.48	$727,119.25	$53,778.34	$336,918.22	-	$282,897.21	-	$43,491.00	$326,388.21
Montana	86,905.90	-	86,905.90	6,239.39	47,727.74	-	28,807.77	-	4,131.00	32,938.77
Washington	97,448.41	-	97,448.41	8,885.00	52,391.43	-	32,330.48	-	3,841.50	36,171.98
Wyoming	676.77	-	676.77	676.77	-	-	-	-	-	-
Total	$902,115.85	$10,034.48	$912,150.33	$69,579.50	$437,037.39	-	$344,035.46	-	$51,463.50	$395,498.96

*Including National Parks, Indian Reservations and O and C.

State	Recapitulation By Activities (Federal and State)						
	Supervision Including State and District Leaders	Ribes Eradication	Cultivated Black Currant Eradication	Nursery Sanitation	Canker Elimination	Preeradication Survey	All Other (Checking, Field Data and Miscellaneous)
Idaho	$41,233.54	$635,543.45	-	-	$1,250.00	$1,592.00	$47,500.26
Montana	7,300.00	76,982.90	-	$130.50	292.50	-	2,200.00
Washington	5,727.00	70,681.10	-	-	-	-	21,040.31
Wyoming	-	-	-	-	-	-	676.77
Total	$54,260.54	$783,207.45	-	$130.50	$1,542.50	$1,592.00	$71,417.34

TABLE 4A

SUMMARY OF ALL EXPENDITURES 1918-1940 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Cooperative Funds)	Grand Total	Recapitulation By Programs					
				Regular	Emergency				
				Federal And State Coop.	FED.,W.P.A., C.W.A.,ERA., N.Y.A.	State W.P.A.	E.C.W. S.C.S.	P.W.A.	Total Emergency Programs
Colorado	$ 79,290.00	-	$ 79,290.00	$ 11,852.04	$ 59,396.51	-	-	$ 8,041.45	$ 67,437.96
Idaho	9,444,546.29	$220,532.13	9,665,078.42	3,520,345.77	3,321,918.87	-	$ 982,788.00	1,840,025.78	6,144,732.65
Montana	919,970.37	-	919,970.37	333,087.45	328,277.57	-	20,440.50	238,164.85	586,882.92
Washington	1,065,690.73	-	1,065,690.73	333,641.66	437,039.29	-	55,489.50	239,520.28	732,049.07
Wyoming	75,871.96	-	75,871.96	10,480.59	58,283.96	-	-	7,107.41	65,391.37
Total	$11,585,369.35	$220,532.13	$11,805,901.48	$4,209,407.51	$4,204,916.20	-	$1,058,718.00	$2,332,859.77	$7,596,493.97

State	Recapitulation By Activities (Federal and State)						
	Supervision (Including State and District Leaders)	Ribes Eradication	Cultivated Black Current Eradication	Nursery Sanitation	Canker Elimination	Preeradication Survey	All Other (Checking, Field Data and Miscellaneous)
Colorado	$ 12,826.89	$ 49,302.91	-	-	-	$ 6,437.85	$ 10,722.35
Idaho	437,663.59	8,539,974.86	$ 28,173.15	-	$1,250.00	61,931.26	596,085.56
Montana	52,753.41	702,928.13	22,010.30	$16,719.27	292.50	13,302.91	111,963.85
Washington	42,128.13	667,320.19	63,838.81	2,273.74	-	5,077.77	285,052.09
Wyoming	11,461.74	46,834.40	-	-	-	6,270.73	11,305.09
Total	$556,833.76	$10,006,360.49	$114,022.26	$18,993.01	$1,542.50	$93,020.52	$1,015,128.94

TABLE NO. 4B

STATUS OF BLISTER RUST CONTROL 1918-1940 (INCLUSIVE)

State	Control Area Including Border Zones (Acres)	Net Control Area Initially Protected (Acres)	Control Areas Reworked Subsequent to Initial Protection (Acres)	Number 8-Hour Man Days (Man Days)	Ribes Destroyed (Wild and Cultivated) (Number)	Remaining Control Area Needing Initial Protection (Acres)	Estimated Protected Area Now on Maintenance Basis* (Acres)
Colorado	206,000	14,859	1,302	6,956	497,535	191,141	8,000
Idaho	2,153,741	1,620,859	319,263	1,639,920	366,108,109	532,882	661,830
Montana	194,544	123,281	8,113	95,674	17,125,928	71,263	63,183
Washington	169,349	119,162	29,233	129,605	32,027,876	50,187	46,729
Wyoming	247,900	21,760	-	6,940	1,085,771	226,140	9,000
Total	2,971,534	1,899,921	358,571	1,879,095	416,845,219	1,071,613	788,742

*Maintenance - Any portion of a control area that has through artificial (eradication of ribes) or natural treatment (shading out of ribes) acquired a status wherein the scarcity of ribes assures effective blister rust control for an indefinite period, such that no further work (except perhaps scouting) is expected to be needed during the current forest cycle. This status continues for a varying number of years until, after a major ecological change, a renewed increase and growth of ribes again endangers the pine, and these areas then revert to a rework status.

TABLE NO. 5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1940

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days
National Forests	22,393	5,500,585	26,671	44,513	5,533,018	56,879	66,906	11,033,603	83,550
O and C Revested Lands	-	-	-	-	-	-	-	-	-
Other Public Domain	170	32,197	208	529	73,860	680	699	106,057	888
National Parks	1,533	157,249	1,699	457	55,631	1,285	1,990	212,880	2,984
Indian Reservations	-	-	-	-	-	-	-	-	-
Subtotal Federal	24,096	5,690,031	28,578	45,499	5,662,509	58,844	69,595	11,352,540	87,422
State and Private	12,512	2,753,104	14,804	35,491	5,728,495	41,923	48,003	8,481,599	56,727
Grand Total	36,608	8,443,135	43,382	80,990	11,391,004	100,767	117,598	19,834,139	144,149

NATIONAL PARKS

	Initial Work			Reeradication Work			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
Glacier	1,533	157,249	1,699	-	-	-	1,533	157,249	1,699
Mount Rainier	-	-	-	457	55,631	1,285	457	55,631	1,285
Total	1,533	157,249	1,699	457	55,631	1,285	1,990	212,880	2,984
NATIONAL FORESTS									
Clearwater	1,563	-	-	4,353	-	-	5,916	-	-
St. Joe	1,297	-	-	19,139	-	-	20,436	-	-
*Coeur d'Alene	3,363	-	-	10,830	-	-	14,193	-	-
Kaniksu	8,297	-	-	8,508	-	-	16,805	-	-
Cabinet and Kootenai	2,293	-	-	1,683	-	-	3,976	-	-
Kootenai	5,580	-	-	-	-	-	5,580	-	-
Total	22,393	-	-	44,513	-	-	66,906	-	-
STATE AND PRIVATE LANDS									
Idaho	9,186	1,920,915	11,912	30,622	5,047,967	37,755	39,808	6,968,882	49,667
Montana	1,596	138,492	1,366	472	34,866	478	2,068	173,358	1,844
Washington	1,730	693,697	1,526	4,397	645,662	3,690	6,127	1,339,359	5,216
Total	12,512	2,753,104	14,804	35,491	5,728,495	41,923	48,003	8,481,599	56,727

*Includes National Forest land in Mount Spokane unit.

TABLE NO. 5A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS 1918-1940 (INCLUSIVE)

Land Ownership a	Total Acreage of White Pine Worth Protection b	Control Areas		Initial Eradication		
		Total Acreage* (White Pine and Protective Zones) c	Acreage Not Yet Worked Initially d	Net Acreage Worked e	Number Ribes Destroyed f	Number 8-Hour Man Days g
National Forests R-1	1,385,505	1,341,547	332,201	1,009,346	211,427,908	905,213
National Forests R-2 and 4	421,000**	421,000**	384,381	36,619	1,496,420	13,232
Subtotal	1,806,505	1,762,547	716,582	1,045,965	212,924,328	918,445
Other Public Domain	31,905	30,865	14,068	16,797	2,807,572	10,896
National Parks	106,254**	40,154**	29,327	10,827	1,961,332	12,852
Indian Reservations (Shoshone)	11,000**	11,000**	11,000	-	-	-
Subtotal Federal	1,955,664	1,844,566	770,977	1,073,589	217,693,232	942,193
State and Private	1,252,080	1,126,968	300,636	826,332	143,624,248	551,907
Grand Total	3,207,744	2,971,534	1,071,613	1,899,921	361,317,480	1,494,100

*Column d + column e equals column c the total of column e of this table should agree with the total of column f of Table 1A.
**Indefinite

Land Ownership	Reeradication Work			Totals (Initial and Rework)		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
National Forests R-1	188,402	25,954,861	218,299	1,197,748	237,382,769	1,123,512
National Forests R-2 and 4	1,962	86,886	664	38,581	1,583,306	13,896
Subtotal	190,364	26,041,747	218,963	1,236,329	238,966,075	1,137,408
Other Public Domain	5,194	760,383	5,827	21,991	3,567,955	16,723
National Parks	5,349	412,036	6,096	16,176	2,373,368	18,948
Indian Reservations	-	-	-	-	-	-
Subtotal Federal	200,907	27,214,166	230,886	1,274,496	244,907,398	1,173,079
State and Private	157,664	28,313,573	154,109	983,996	171,937,821	706,016
Grand Total	358,571	55,527,739	384,995	2,258,492	416,845,219	1,879,095

SUMMARY OF RIBES ERADICATION ON NATIONAL PARKS 1918-1940 (INCLUSIVE)

National Parks (List Separately) a	Total Acreage of White Pine Worth Protection b	Control Areas		Initial Eradication		
		Total Acreage* (White Pine and Protective Zones) c	Acreage Not Yet Worked Initially d	Acreage Worked e	Number Ribes Destroyed f	Number 8-Hour Man Days g
Mt. Rainier	8,254	8,254	-	8,254	1,640,507	10,070
Glacier	20,000	10,000	7,427	2,573	320,825	2,782
Yellowstone	69,000	12,900	12,900	-	-	-
Grand Teton	2,000	2,000	2,000	-	-	-
Rocky Mountain	7,000	7,000	7,000	-	-	-
Total National Parks	106,254	40,154	29,327	10,827	1,961,332	12,852

*Column d + column e = column c.

National Parks (List Separately)	Reeradication Work			Totals (Initial and Rework)		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
Mt. Rainier	5,349	412,036	6,096	13,603	2,052,543	16,166
Glacier	-	-	-	2,573	320,825	2,782
Total National Parks	5,349	412,036	6,096	16,176	2,373,368	18,948

TABLE NO. 5A (Continued)

SUMMARY OF RIBES ERADICATION ON NATIONAL FORESTS 1918-1940 (INCLUSIVE)

National Forests (List Separately) a	Total Acreage of White Pine b	Control Areas		Initial Eradication		
		Total Acreage (White Pine and Protective Zones)* c	Acreage Not Yet Worked Initially d	Acreage Worked e	Number Ribes Destroyed f	Number 8-Hour Man Days g
Clearwater	204,730	195,870	47,776	148,094	-	-
St. Joe	312,080	300,991	89,291	211,700	-	-
Coeur d' Alene**	358,395	348,092	37,803	310,289	-	-
Kaniksu	346,775	346,775	107,518	239,257	-	-
Cabinet	76,630	74,318	21,093	53,225	-	-
Kootenai	86,895	75,501	28,720	46,781	-	-
Subtotal Region One	1,385,505	1,341,547	332,201	1,009,346	211,427,908	905,213
Region Two	394,000	394,000	357,381	36,619	1,496,420	13,232
Region Four	27,000	27,000	27,000	-	-	-
Total	1,806,505	1,762,547	716,582	1,045,965	212,924,328	918,445

*Column d and column e = column c.
**Includes national forest land in Mount Spokane unit.

National Forests (List Separately)	Reeradication Work			Totals (Initial and Rework)		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
Clearwater	46,973	-	-	195,067	-	-
St. Joe	60,793	-	-	272,493	-	-
Coeur d'Alene*	47,859	-	-	358,148	-	-
Kaniksu	27,698	-	-	266,955	-	-
Cabinet	3,914	-	-	57,139	-	-
Kootenai	1,165	-	-	47,946	-	-
Subtotal Region One	188,402	25,954,861	218,299	1,197,748	237,382,769	1,123,512
Region Two	1,962	86,886	664	38,581	1,583,306	13,896
Region Four	-	-	-	-	-	-
Total	190,364	26,041,747	218,963	1,236,329	238,966,075	1,137,408

*Includes national forest land in Mount Spokane unit.

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS 1918-1940 (INCLUSIVE)

State and Private Lands (List by States) a	Total Acreage of White Pine b	Control Areas		Initial Eradication		
		Total Acreage* (White Pine and Protective Zones) c	Acreage Not Yet Worked Initially d	Acreage Worked e	Number Ribes Destroyed f	Number 8-Hour Man Days g
Idaho	1,145,975	1,023,353	271,653	751,700	125,478,796	486,777
Montana	37,215	34,725	14,023	20,702	2,690,948	14,170
Washington	68,890	68,890	14,960	53,930	15,454,504	50,960
Total	1,252,080	1,126,968	300,636	826,332	143,624,248	551,907

*Column c = column d and column e.

State and Private Lands (List by States)	Reeradication Work			Totals (Initial and Rework)		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
Idaho	137,254	24,417,534	133,533	888,954	149,896,330	620,310
Montana	3,034	416,929	3,841	23,736	3,107,877	18,011
Washington	17,376	3,479,110	16,735	71,306	18,933,614	67,695
Total	157,664	28,313,573	154,109	983,996	171,937,821	706,016